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THE PHYSICAL DIAGNOSIS

OF

DISEASES OF THE ABDOMEN.

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PHYSICAL DIAGNOSIS

OF

DISEASES OF THE ABDOMEN.

BY

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PREFACE.

THE endeavour has been made in the present little volume to remove some of the difficulties which surround the diagnosis of a confessedly obscure class of diseases. Whether the plan adopted has proved in any degree successful, it remains for the profession to decide.

The author has sought less to announce new facts than to generalise known phenomena; and, while preserving conciseness, to offer to his professional brethren a book which may be useful at the bedside of the sick.

Of the three parts into which, for the sake of system, the work has been divided, the First is devoted to a brief description of the method of making a physical examination of the Abdomen, and of the results which it affords in health and disease. In the Second Part, those diseases of the Abdomen are considered seriatim, which furnish indications of their presence on physical examination. In the Third Part the most remarkable physical signs of disease are re-enumerated; and attached to them are the names of those morbid states, which experience has shown may be connected with each.

42, MYDDELTON SQUARE,
May, 1852.

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CORRIGENDA.

Page 45, line 32, *for* Latterly, *read* Laterally.
54 „ 16, *for* determines, *read* determine.
192 „ 21, *for* There is also, *read* There may be also.

ON THE PHYSICAL DIAGNOSIS

OF THE

DISEASES OF THE ABDOMEN.

PART I.

METHOD AND GENERAL RESULTS OF PHYSICAL EXAMINATION.

1. Sight, touch, and hearing, are the senses through which our mind becomes cognisant of the physical condition of any portion of the body. Physical examination then will consist in *inspection*, assisted by artificial means of rendering its results accurate, the several methods of *measurement;* secondly, in the application of the hand, or *palpation;* and, thirdly, in *auscultation*, assisted by an artificial mode of eliciting sound, *percussion*. We are all familiar with these modes of examination as applied to the chest, but in regard to the abdomen they are not uncommonly either altogether neglected as means of acquiring information touching disease in that region, or used in so slovenly and inaccurate a manner as to lead as often to erroneous as to correct conclusions. But although each method of examination is common to thoracic and abdominal exploration, yet each is not in an equal degree applicable to both. The reason of this is the different character of the enclosing structures in either region. The organs of the

thorax are boxed up within walls which, though not entirely unyielding, are sufficiently so to prevent any handling of the parts within ; and the same structure places a limit on the indications which the exterior can give of changes which are wrought in them by disease. The lax and soft tissues, however, of which a great part of the abdominal parietes is made up, yield readily to the pressure of the hand, so that with their mediation it can perceive the size, form, and consistence of many contained parts, and changes in bulk which may chance to occur in the latter, readily become perceptible to the eye by elevation, or falling in of the superjacent wall. Nor can it be said that the thorax has any advantage over the abdomen in the value of the results of percussion, although at present the art of auscultation furnishes the physician with more numerous indications of disease in the former, than it has yet been made to supply in the case of the latter region.

2. *Regional limits of the abdomen.*—The upward anatomical limit of the abdomen is the arch of the diaphragm ; below, it is commonly said to be bounded by the rim of the true pelvis. In disease, however, we are continually reminded of the very artificial nature of this lower boundary line. Organs which in health occupy solely the pelvis, rise in disease above the level of its rim, and take a place among the viscera proper to the abdomen; while, on the other hand, not only are healthy abdominal structures prolonged into the pelvis—as for instance the intestine and peritoneum,—but products of disease gravitate there, and morbid changes, originating in the one, influence the condition of the other cavity, just as if there were really no distinction between them. In fact, when morbid phenomena are under consideration, limitations which the mere anatomist finds it convenient to make must give way to boundaries which nature herself has established, and all must be regarded as organs of the abdomen, whatever their structure and wherever placed, which are covered by its serous membrane, the peritoneum. The strict lower limit of the abdomen, then, is so

much of the pelvis and its organs as the peritoneum lines and covers. Above, the arch of the diaphragm is the limit, on the upper surface of which lie the lungs and heart, separated from it by the sacs of the pleura and pericardium. The summit of the diaphragmatic arch reaches on the right side the level of the fourth intercostal space; on the left side it only attains that of the fifth rib. On the surface, however, the line which marks the upward limit of the abdomen and the lower limit of the true chest, that which corresponds with the separation of the diaphragm from the thoracic wall, and with the reflection of the serous membranes of the pleuræ or pericardium upon it, passes from the lower extremity of the sternum almost horizontally to the right (at first a little downwards), "across the conjoined cartilages of the sixth and seven ribs, then behind the fifth intercostal space," and thence backwards to the junction of the twelfth rib with the vertebra. This line on the left side takes at first a little lower level, but ultimately attains the corresponding point posteriorly. But as, in some diseases of the chest, the lower limit of the thorax may be depressed below the natural level by the yielding of soft tissues in that direction; so, in some diseases of the abdomen, the upper limit of this region may encroach more or less seriously on the space allotted to the thoracic viscera, by the yielding of the diaphragm and spongy lungs to the pressure from below. In the other direction, increased space is sometimes gained by compression of the bladder, by depression of the uterus towards the outlet of the pelvis, and by a bulging into its canal or towards the vulva of the vaginal wall. Hence it happens that the physical signs of abdominal disease are not confined to those parts which are included in the limits of the healthy abdomen, nor indeed to the truly abdominal organs alone, but must be sought also by examination directed to the chest and its organs, on the one hand, and to the pelvis and its organs on the other.

INSPECTION.

3. The information which inspection affords us has relation to *size*, *form*, and *motion*.

Mode of inspecting the abdomen.—In accordance with my former remarks, inspection must take in simultaneously the abdomen and the chest. Both must of course be uncovered and exposed in a good light, the subject being protected from cold by a previous regulation of the temperature of the room. This is essential, not only for the benefit of the person examined, but because a sensation of chilliness is incompatible with that perfect rest which it is desirable that the abdominal and thoracic muscles should maintain during the period of inspection. The position of the subject may be either the erect or recumbent. In disease the latter is often the only available one; but when possible, the erect posture is often to be preferred. Whichever posture is selected, the arms should hang or lie loosely by the side; the subject should stand on a level surface, or lie upon an elastic but moderately resistant mattress; the carriage of the head should be unconstrained, or, if the patient be lying, it should be supported at the same angle with the trunk as it holds in the erect position. Above all, the physician must not allow the examined to take the place of the examiner; his eyes must be kept directed to some object, either in front of him, or, if he be lying, to the ceiling. An infringement of this rule is often fatal to the accuracy of either inspection or measurement; for, almost involuntarily, some of the muscles will be thrown into activity, or the natural movements be disturbed, when the person directs his attention to them.

Inspection may be made from the front, from behind, and from the sides. Sometimes, also, much information is gained in disease by inspecting the patient in several positions—as standing, sitting, lying upon the back or upon either side, or supported by the hands and knees.

The results of inspection may be referred to two classes—viz., those which relate to the size and form of the exterior, and those which relate to its movements during the respiratory acts.

Results of Inspection in Health.

4. The general outline of the abdomen is gently convex; but the surface indicates, by various elevations and depressions, the position of the several tissues which constitute its parietes, and, in some cases, of the organs over which they lie. Viewing it from the front, the *upper superficial limit of the abdomen*, which has been described (2), is indicated by a depression corresponding with the lower end of the sternum, and passing outwards across the conjoined cartilages of the sixth and seventh ribs, and the fifth intercostal space on either side—rather lower, as has been said, on the left side than on the right. Tracing the *lateral outline of the thorax* below this line, it is seen to form a bulging curve downwards, the fullest part being nearer the upper than the lower part of the bulge. This bulging is more marked, for the most part, on the right side than on the left, corresponding, in the former case, with the position of the liver, and in the latter, with that of the stomach and spleen. The prominence on the left side will vary with the varying states of fulness of the stomach with alimentary or gaseous matters. There is rarely, unless the subject be fat, or the wall infiltrated with serum, any difficulty in perceiving the *outline of the lower margin* of the framework of the thorax, by the change in tension of the wall in passing from this to the part bounded by the laxer substance of the muscles and aponeuroses of the abdomen. *Below the margin of the thorax* the elevations and depressions of the wall correspond with the position and anatomical peculiarities of its muscular element, and in some degree, also, with the position of subjacent viscera. These markings should be well impressed upon the mind. From the navel downwards to the pubic symphysis, the abdomen presents an even convexity, which extends laterally to that part

which corresponds with the situation of the lineæ semilunares of the abdominal aponeurosis. Above the navel, however, corresponding with the linea alba, is a shallow depression, best marked at the upper part, and opposite the ensiform cartilage. On each side of this the recti abdominis muscles elevate the surface, but are crossed by transverse shallow depressions, corresponding with their tendinous intersections: the uppermost of these is the least obvious; the lowermost, crossing the muscles just above the navel, is the broadest. External to the recti, and a little internal to the vertical line of the nipples, there is a depression, commencing broad at the margin of the cartilages of the ribs, and running downwards in the direction of the lineæ semilunares, becoming narrower and more shallow below the level of the navel. Exterior to this there is, again, some fulness corresponding with the muscular portion of the broad muscles of the abdomen. The situation of the cristæ ilii, unless in emaciated subjects or in cases of inanition, is marked by a groove, above which the wall bulges out into an elevation of an oval form, which passes downwards and inwards to the lineæ semilunares, terminating about the upper part of Poupart's ligament. *Viewing the trunk from behind*, we see, external to the fulness which marks the commencement of the fleshy mass of the erector spinæ, a shallow depression, corresponding with the extremity of the twelfth rib. The *lateral view of the abdomen* affords a profile corresponding with the above description of the form of the region. It enables us, however, to form a better idea of the antero-posterior diameter of this part of the trunk, as the anterior or posterior inspection does of its lateral width. In persons whose chests are not covered with much fat, we may also sometimes see the spot of the *impulse of the apex of the heart* in the fifth intercostal space, disappearing or becoming faint on an inspiration being taken. In thin persons, occasionally a slight movement is visible below the ensiform cartilage, and where, in addition, the curve of the lumbar region is considerable, occasionally some pulsation also above the navel.

5. These results of inspection vary, however, with age, sex, habits, the condition of the wall, and the varying state of subjacent organs. *Age:* in youth, in proportion to the nearness to childhood, the size and prominence of the abdomen from the bulk of its contained organs will be greater, while the muscular prominences and depressions will be less strongly marked than in the adult; the depression marking the upper limit of the abdomen will be lower, and from it downwards the bulge of the lower ribs will be greater, and they and their cartilages will project more externally. *Sex:* in the female a modification arises from the lower degree of the muscular development, and from the greater width of the alæ of the pelvis. The compressing influence of the stays, worn more or less tightly by almost all females, contracts the natural bulge of the lower ribs, and renders the costal angles more acute,* while the lower border of the ribs and their cartilages are forced outwards by the pressure of the displaced organs. This displacement has its influence, also, in modifying the natural depressions of the abdominal wall. *Habits:* in the sedentary the abdomen is fuller in comparison with the chest than in those who undergo active labour; the chest is lengthened as its breadth is diminished, and the costal angles are more acute. *Condition of the wall:* fatness and serous infiltration often destroy all traces of the natural markings; the latter, especially, may cause some deception, by being limited or modified by the pressure of the waistband of the trousers or other articles of dress, as well as by its gravitation to either side, or to whatever may be the depending part. *The varying state of subjacent organs:* this may be exemplified by the instance of the stomach, which, when distended, has its great curvature directed forwards, pressing outwards the costal cartilages and the left lobe of the liver, behind which it lies, and causing that side to be fuller and more prominent than in the empty state of the organ.

6. *The expansion of the chest in inspiration* is effected not

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* The *costal angle* is that formed by the margin of the cartilages of the false ribs and the middle line.

only by the movements of the ribs, but also, and principally, in ordinary breathing, by the descent by contraction and flattening of the diaphragm, which, pushing downwards the subjacent organs, causes a protrusion to a corresponding extent of the abdominal walls anteriorly and laterally, which is very evident to the eye. There is also visible a descent of the depression marking the lower limit of the true thorax. The acts of inspiration and expiration are of about equal length.

Physical Signs derived from Inspection in Disease.

7. *General abdominal enlargement* is often preceded by one of the partial enlargements, of which it appears to be the development and sequel; but in other cases this is not observed, the whole face of the abdominal wall gradually protruding. In extreme cases there is seen a lateral bulge from the crest of each ilium to some point at the side of the thorax, either at or above the seat of the natural transverse depression. The costal angles are considerably widened, and the margin of the lower thoracic cartilages more or less everted. In proportion to the youth of the subject, the sternum is thrown forward, and the apex of the ensiform cartilage becomes everted. The age of the patient regulates very much the degree to which the walls of the thorax yield to pressure from below. In the child they readily give way, so that the trunk assumes almost a fusiform shape; in the aged, on the other hand, the ossification of the cartilages opposes this, and the thoracic part of the enlargement is at its minimum. The regularity and symmetry of the abdominal protrusion, and the effect of posture upon it, will vary with its cause. Posteriorly, the surface outside the erector spinæ may partake of the general fulness. Even the inferior boundary of the pelvis may yield, and the perinæum present some prominence. The physical cause of general abdominal enlargement is either a great and general increase in the thickness of the parietes of he abdomen without any, or with insufficient compensating

diminution in the bulk of contained parts, or else a great increase in the bulk of abdominal organs, or an accumulation of normal or abnormal matters—gaseous, liquid, or solid—within them or within the cavity of the peritoneum. Two or more of these sources of increased bulk may be conjoined.

8. *Partial abdominal enlargement* manifests itself in unnatural fulness, bulging, or elevation of any part of the abdominal parietes, sometimes merely in effacement of a normal depression. The two sides, which are more or less symmetrical in health, may be compared. The physical cause of partial enlargement is similar to that of general enlargement, but only acting over a limited space. It may ultimately terminate in a general enlargement, and in these cases the part in which it commences will often exhibit a predominant fulness. The size and form of the enlargement should be noted, since these, together with its seat, will often lead to the recognition of its cause. Alteration of the posture of a patient sometimes influences the enlargement, rendering it more or less prominent or altering its seat. An examination at different times of the day, before and after meals or defecation, will often lead to useful information. Partial enlargement is capable of being obscured or rendered more prominent by other circumstances. A flatulent state of the digestive tube may render it inappreciable by raising the remainder of the abdominal wall to the same level, and to a certain extent converting partial into general enlargement. On the other hand, an enlargement may be rendered unusually prominent, or even be created when otherwise there would be none, by the retraction of the abdominal wall over all the parts not prevented from retracting by the presence of local disease. It is thus that inanition acts sometimes in developing this sign, when otherwise the disease is only physically determinable by the discovery of palpable tumour. When a tumour or enlarged organ lies in front of a viscus of varying calibre such as the stomach or intestine, distension of the latter may also elevate

the former, so as to cause a local fulness, while at other times no visible sign of its presence is observed.

Both general and partial abdominal enlargement may arise from other causes than disease in the abdomen. Empyema, emphysema, or pericardial effusion, may act thus, by depressing the diaphragm, and causing either some general fulness, or merely a local fulness below the margin of the ribs.

9. *General depression or retraction*, in its minor degrees, affects principally the more yielding portions of the abdominal wall, the profile of which is then concave in place of being convex. Viewed from the front, the abdomen appears to form a basin, its upper rim being the margin of the thorax, its lower the pubes, Poupart's ligaments and the spines of the ilia; the crests of the iliac bones project, and the lateral wall of the abdomen is incurved. In its highest degree, the natural bulges over the lower ribs are flattened, the margins of the ribs are approximated, and thus the costal angles are rendered more acute; and there may, in addition, be visible evidence of the presence of the liver far below the margin of the ribs. A diminution of a previous general or partial enlargement arising from intra-abdominal disease, may be due to causes exterior to the abdominal cavity, such as emaciation or the lessening of œdema. When, however, real and absolute retraction occurs to an extent beyond what is normal, it can only result from an empty condition of the viscera naturally filled with gas, or from a contraction of the abdominal parietes, muscular or organic, emptying the hollow organs of their gaseous contents, or forcing the organs up into the region of the thorax. When the last occurs, the lower aperture of the thorax is expanded at the same time.

10. *Partial depression or retraction* may occur wherever an organ either diminishes in bulk from disease, or, if hollow, is reduced to an unusually empty condition, the depression appearing over the seat of the diminished part. Unless the natural form of the abdomen be kept in mind, the error of taking the

depressed for the healthy portion, and the natural portion for an enlargement, may be committed, especially when the sides are compared. Retraction of the wall from causes acting merely on the muscles may readily be distinguished from that arising from internal disease. Partial depression or retraction are due to the local operation of similar causes to those in which general depression originates.

11. *The convolutions of the small intestines* are sometimes traceable by their form upon the exterior of the abdomen. This sometimes occurs in those subjects who are in perfect health, but it is also a sign of disease, especially so in those cases in which the abdominal wall has not lost any of its normal thickness. It thus occurs in some cases where the intestines are distended with flatus or liquid fæcal matters, or where they are thickened or adherent to the abdominal parietes. The form of the stomach and colon may also be sometimes discerned.

12. *Protrusion of the vaginal wall beyond the os externum* is sometimes a visible sign of disease. It can only occur indeed where the parietes of the canal are physically weakened, while some amount of force is applied by means of enlargement of, or accumulation within organs which are external to it, or by their displacement. It may consist either of the anterior or the posterior wall of the canal.

13. *Altered position of the umbilicus.*—In the healthy subject, a line drawn horizontally between the highest points of the two cristæ ilii crosses the umbilicus in the middle line. It is nearer to the pubic symphysis than to the base of the ensiform cartilage or bottom of the sternum. In some diseases producing enlargement, the height of the navel is manifestly altered, and it is noticed to be either further from the bottom of the sternum than in health, or proportionally nearer to it. This has often indicated to me the seat of the original disease; for, where it has occupied the upper part of the cavity, the distance of the navel from the bottom of the sternum has been greater than the natural proportion, whereas, in cases where disease has originated

below, I have seen the natural proportion of its distance between this point and the pubes actually reversed. This is more likely to occur when, by adhesion below the navel, a tumour in this situation causes the wall of the abdomen to rise with it.

14. *Altered appearance of the umbilicus.*—The natural appearance of this fold does not require description. In disease (*a*) the depth of its *depression may be lessened,* or there may be greater or less *prominence.* This indicates either a local weakening of the parietes of the abdomen at this point, so that it yields to the customary pressure exerted by the organs upon the interior of the wall; or else, either conjoined or not with the above, an increase in the pressure exerted upon that part of the abdominal wall alone, or upon the parietes generally. It is hence mostly conjoined with general abdominal enlargement (7), or with enlargement or tumour connected with that region of the abdomen in which the fold lies (8). Prominence may also be due to disease occupying this portion of the wall alone. (*b*) Its circumference may be increased and its *surface flattened out* to the general level of the abdominal wall. The only instance of the occurrence of this sign which I have met with, had for its physical cause cancerous degeneration of the parietal peritoneum, occupying the part corresponding to the navel in common with the rest of the wall. As the disease increased and acquired latitude, the whole wall must have expanded with it, and, all parts expanding alike, this portion must have partaken of the common increase of breadth. (*c*) The *depression may be increased.* There are two causes of depression met with; one is an increase in the thickness of the wall around the fold, leaving a deep pit in its situation; the other an absolute retraction corresponding with a diminution of the abdominal contents, indicated by some accompanying retraction below the navel or by retraction of the wall about the fold (10).

15. *Enlargement of the superficial veins of the abdomen* occurs where the return of blood by the large veins of the abdomen is seriously obstructed. In the slighter degrees of obstruction it is

seen only in the abdominal superficial veins descending to one or both groins; but, in its highest degrees, as where the vena cava and vena portæ are both obstructed, veins as large as a finger may be seen convoluted and anastomosing over the whole abdomen, some of them appearing to pass into the cavities of the trunk through the intercostal spaces and axillæ. In these extreme cases the superficial veins of the lower extremities may likewise be distended. The direction of the flow in the distended veins often gives valuable information as to the seat of the obstruction, and may be noted by exerting pressure with the finger, and observing on which side the vein fills out.

16. *Visible pulsation,* when occurring only below the ensiform cartilage, may be due to the action of the heart; below this, pulsation is due to the vessels within the abdomen. It may be limited to a certain spot, or may be diffused over a considerable surface. Its degree may be trifling, or it may be so violent as to agitate the patient, and the bed upon which he lies. When visible between the ensiform cartilage and navel, in cases of great abdominal retraction (9), it is commonly no more than the ordinary aortic pulsations, rendered visible by the diminution of the mass between the aorta and the surface. In other instances it is due to unusual yielding of the parietes of the aorta during the heart's systole and consequent inordinate pulsatory expansion, similar to that which is sometimes observed in the carotids, or in arteries leading to inflamed parts; or it may result from an aneurismal swelling of an artery (either the abdominal aorta or one of its branches,) approaching the parietes; or it may depend upon the pulsations of the large vessels in their normal state, elevating a tumour between them and the wall of the abdomen.

17. *Movements,* as if of parts contained within the abdomen, are sometimes visible on the exterior. They may consist of irregular knottings or abrupt elevations lasting for a variable time, and then subsiding, being due to spasmodic contractions of portions of the abdominal muscles. In other cases they have a

vermicular character, and are traceable to the movements of the small intestines, being conjoined with visibility of their convolutions (11): like that sign, vermicular movement may be a healthy phenomenon, or may result from contractions of the muscles of the abdominal wall. In a third class of cases, more abrupt and decided elevations occur, giving the idea of some living body moving in the abdomen. The movement may be gradual or sudden in its character, in the latter case even agitating the body of the patient. Its cause sometimes appears to be situated immediately beneath the integuments and abdominal wall, in other cases at a greater depth. This sign results either from actual movements of a solid body (a fœtus), or from the movements of bodies of gas from one portion of the intestine to another.

Signs of altered position of the Diaphragm and Thoracic Organs.

18. *Altered level of the transverse thoracic depression.*—The upper boundary of the bulges of the lower ribs is raised a little in cases of great abdominal distension (7), corresponding with the altered level of the liver on one side, and of the stomach and spleen on the other. In cases where thoracic disease—as emphysema—depresses these organs, it is said that there may be formed in young subjects a new but slight depression marking the new upper boundary of the abdomen: the original depression may remain more or less obvious, according to the age of the patient.

Altered visible seat of impulse of the heart.—Where, in thin subjects, the diaphragm is raised by pressure from below, the impulse of the heart's apex may occasionally be seen higher than ordinary, and more to the left.

The signs which indicate elevation of the diaphragm acknowledge the same causes as those which occasion visible enlargement of the abdomen. When the enlargement which occasions the detrusion affects only one side of the abdomen, these signs may be altogether or almost entirely limited to the corresponding side of the thorax.

Abdominal Respiratory Movements.

19. *Defective abdominal respiratory movement.*—(*a*) This may be *general*, affecting not only the forward and lateral movement of the abdominal soft wall, but also the expansion of the lower ribs. These movements are sometimes quite inappreciable to the unassisted eye. This arrest of abdominal expansion is constantly accompanied by a *proportionally increased respiratory movement of the sternal ribs.* Its physical cause is either an impediment offered by tumour or enlargement to the descent of the diaphragm, from their situation in the upper regions of the abdomen, or from their size; or else the voluntary or instinctive opposition offered to diaphragmatic descent in consequence of the presence of painful disease over a considerable extent of the abdomen. (*b*.) It may be *partial*, occurring at any portion of the wall. The movement of the whole or of a part of one side may be thus restrained; and, as in general defective motion, there is an exaggeration of the movement of the upper ribs, most marked upon the opposite side. Defective movements unnoticed during ordinary breathing become very obvious when an inspiration is forced. The cause of this defective movement is a muscular obstacle placed to the expansion, when motion over a diseased part is productive of pain; or an opposition to the descent of one side of the diaphragm alone by painful disease or tumour in its neighbourhood. This is not a sign peculiar to internal abdominal disease; beside painful affections of the wall, inflammatory affections of the serous surfaces above the diaphragm and paralysis of the muscle have a similar effect. *Exaggerated abdominal movement* occurs only as a sign of *thoracic* disease. *Defective descent of the depression marking the boundary* of the chest and abdomen on deep inspiration, is observed where the diaphragm itself is restrained in its descent.

20. *Altered rhythm of respiration.*—There is only one disease external to the thorax in which this has been observed to occur, and that is peritonitis. Here the expiratory act is shorter than the inspiratory. (Sibson.)

MENSURATION.

21. Measurement renders accurate the results of simple inspection, and, like it, may be applied to the chest and abdomen, either to ascertain their dimensions when at rest, or to determine the extent of their respiratory movements.

Mode of Measuring.—The precautions to be observed as to the patient are the same as for inspection. The most convenient instrument for ordinary use is an inelastic tape, marked with tenths of an inch, but for certain purposes the "chest-measurer" of Dr. Sibson* will be found indispensable. In making comparative daily measurements, great care should be taken that the posture of the patient be as nearly as possible the same, and that the tape or chest-measurer be applied over the same parts of the surface. For the latter, the eye and memory will scarcely suffice, and it is consequently advisable to stain the spot or line of the first day's measurement with the nitrate of silver or iodine. Measurement may be either *circular*, for the determination of the girth of the trunk at different parts, and the relative size of the two sides; or it may be applied *to discover the distance between certain points*, as the lower end of the sternum, the pubic symphysis, the anterior spinous processes of the iliac bones or the umbilicus. In making circular measurement, the patient should hold his breath at the end of an ordinary expiration; the commencement of the measuring-tape should be placed exactly at the middle line anteriorly, and from this point it should be carried evenly and horizontally round the trunk, passing over the right side first, till it arrives again at the middle line anteriorly. *To compare the two sides* of the trunk, that of the right may be ascertained by noting the spot at which the tape crosses the middle line behind, and that of the left by subtracting the size of the right side from the entire girth. For this purpose, however, the patient must either sit or stand, and two persons must be engaged in the measurement; one to arrange the extremities of the tape in front, and the other to observe where it crosses the spine behind. When a patient is in bed, and cannot sit up or stand for the measurement to be made, this method cannot be employed. Two tapes may then be joined together at their commencement, and at this spot where they are to be applied to the spine, they may be adapted to it either by padding, or by affixing to the junction a little bent plate of brass: by either plan the apposition of the commencement of the scale of each tape to the spinous processes is secured. Each tape being then brought round to the middle line in front, indicates the circumference of its own side.

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* Med. Chir. Trans., vol. xxxi., p. 535.

22. The measurement of *the extent of the respiratory movement* of any part of the thoracic or abdominal wall can only be ascertained by the use of the chest-measurer. It may be applied either in the recumbent, sitting, or standing posture, the flat plate being laid upon the back, and the rack and dial brought in contact with the spot whose amount of motion is to be tested.

In order to determine the *general enlargement of each semicircumference* with the inspiratory act, the tapes, fixed to the spine at their junction, must be allowed to slip through the fingers, and the point of each, which, at the end of inspiration, corresponds with the median line must be noted. It is difficult to effect this observation on both sides at the same time, and during the same inspiratory act; but to enable this to be done, a little instrument has been devised by Mr. H. Thomson, consisting of a brass plate with a spring at the back of it; the latter retains the tape in contact with the abdominal wall, and allows it to slip between itself and the plate during each inspiratory act.

Results of Measurement in Health.

23. The horizontal lines at which it is most desirable to take the girth of the trunk are at the level of the *nipples* on the fourth rib, and the base of the ensiform cartilage or *lower extremity of the sternum*, for the thorax; and at the *margin of the lower ribs* and the *navel* for the abdomen. In cases where the abdomen is distended by disease, an additional line of measurement is made at its most prominent part. The girths of these several parts present in health pretty constant relations; their absolute girth varies exceedingly. In the robust male, the measurement around the nipples is the largest; that around the lower extremity of the sternum about 1½ inches to 2 inches less; that which embraces the abdomen at the lower margin of the ribs is about 4½ inches less than the last; while one between the lower extremity of the sternum and the lower margin of the ribs will be intermediate according to the part of the liver-bulge at which it is taken. The measurement at the navel is a little larger than that at the lower margin of the ribs. The *comparative measurement of the two sides*, when the stomach is not distended with food, gives generally the following results. Measuring over the nipples and bottom of the sternum, the right side is found to exceed the left in size by from ¼-inch to 1 inch, the greater difference being commonly found in those persons whose employment leads them to make the greatest use of the right arm. Half an inch may be considered the average at the bottom of the sternum, and something less across the nipples. Unless the liver descends low, the measurement of the two sides at the lower margin of the ribs will be equal, or nearly so, and, in the absence of disturbing causes, the same may be said of that across the navel. I have said that the circular measurement should be made with the arms lying parallel to the trunk; for when, as is often done, they are raised at right angles with it,

several alterations take place both in the actual and relative measurements of the two sides. The *navel* is nearer to the pubic symphysis than to the bottom of the sternum; the proportion of its distance from each is about that of 6½ from the former, to 8 from the latter; but this is open to much variety.

24. The circular measurements are influenced by *age*, *sex*, and *habits*. In proportion to the youth of children, the greater is the similarity of size of the two sides, and the greater is the girth of the trunk at the lower margin of the ribs, until, in the infant, it is larger than that corresponding with the bottom of the sternum. In females whose thoracic walls have been altered in form by pressure, the relation of the several girths of the trunk is altered also; the smallest girth is in these persons at the seat of constriction, commonly at what should be the bulge of the liver, and from this point it is found increasing downwards towards the margin of the ribs. Apart from this constriction, however, the girth of the chest appears naturally less in proportion to that of the abdomen than in the other sex. In persons whose occupations are sedentary, the girth around the nipples is proportionally less, and that around the lower margin of the ribs and abdomen proportionally larger, than in the more active labourer.

25. Dr. Sibson has found, as the result of his researches upon this subject, that "in the healthy robust male, the *movement* of the sternum and of the thoracic and intermediate ribs, from the first to the seventh, is from ·02 to ·07 in. during an ordinary inspiration, and from ·5 or ·7 in. to 2 in. (the amount varying with the extreme breathing capacity) during a deep inspiration. The ordinary abdominal (diaphragmatic) movement is from ·25 to ·3 in.; the extreme ·6 to 1·6 in. The ordinary lateral expansion of the diaphragmatic or lower ribs is greater, and the extreme expansion is usually less, than the respective ordinary and extreme expansion of the thoracic or upper ribs. The expansion of the second ribs is usually alike on both sides;

below, all the inspiratory movements, especially those over the heart, are usually somewhat less on the left side than on the right, both during ordinary and extreme inspiration." In females the use of stays restrains the abdominal and exaggerates the thoracic movements. "In infants the thoracic movement is considerable, being from ·02 to ·12 in., while the abdominal is from ·06 to ·15 in."

Results of Measurement in Disease.

26. The results both of static and dynamic measurement in disease afford valuable information as to the condition of internal parts. In estimating this value, however, it must be kept in mind that, in the aged, the rigidity of the thoracic walls presents an impediment to the changes of measurement which disease would produce in younger subjects; and, on the other hand, that chronic enlargement beneath them may produce increase of measurement and bulging on inspection, which will remain after the cause of fulness has ceased to exist. This is not uncommonly noticed in the cartilages of the ribs overlying the stomach. The *signs of disease* which measurement affords are, 1st, *changes both actual and relative of the several girths of the trunk;* 2nd, *changes in the relative size of the two sides;* 3rd, *changes in the distance of the navel from the lower end of the sternum and pubic symphysis.* The *dynamic signs* derived from measurement have reference to *changes in the amount of movement of the several parts of the abdomen and chest*, during the respiratory acts.

The spirometer may be used to determine the extent to which the breathing capacity of the chest is reduced by abdominal as well as by thoracic disease. In using this instrument, however, it must be kept in mind that the results it furnishes are no evidence of absolute encroachment upon the thoracic cavity by abdominal organs, any more than they are of the absolute existence and nature of organic disease of the lungs, since the various affections of both cavities and their walls, which lessen the thoracic expansion on account of pain, etc., necessarily influence its indications.

PALPATION.

27. By the application of the hand to the surface of the abdomen, we receive information not only respecting the abdominal wall, but also respecting all parts which can be felt through it. It informs us of *position*, *size*, *form*, *weight*, *consistence*, and *elasticity*, of *spontaneous movement* or *mobility*, and of the presence of any *vibrations* which may reach the surface. The clearness or obscurity with which internal parts may be felt through the wall, will depend in great measure on its thickness, all other things being favourable to the examination. Hence it occurs in disease, that parts at first not readily felt, or difficult of definition, become more evident as emaciation proceeds or serous infiltration disappears. The obscurity from the latter cause may sometimes be obviated by placing the patient in such a position, for some time previous to the examination, as will favour gravitation of the fluid away from the part.

Mode of palpation.—It need scarcely be said, that for accurate palpation the hand should be applied directly to the surface. Care, however, should be taken that it be not cold, or the contraction of the muscles which its contact would occasion, would interfere with the examination. The parts to which it may be applied are, the soft wall of the abdomen, the spaces between the lower ribs, and the canals of the vagina or rectum. The position of the patient usually selected, for convenience sake, is the supine; but it is often advisable, and even necessary, to examine in the erect posture, or to change it in various ways, as from that on the back to either side, or to place the patient on the hands and knees. In determining the condition of the soft wall of the abdomen, the hand may be passed smoothly over its surface, by which means irregularities from new developments in it may become perceptible; but for deeper parts more or less pressure is requisite, which, according to the object we wish to arrive at, must be variously modified. In most cases, however, the abdominal muscles must be relaxed as far as possible by raising the shoulders, and flexing the thighs upon the belly. This should not be left to be effected by the voluntary efforts of the patient, but both the body and the thighs should be placed in position by assistants, and retained so by the aid of pillows, etc. When this precaution has been neglected, the muscular portions of the abdominal wall have often been confounded with solid bodies within the cavity.

Where parts are tender to the touch, palpation should be very gently performed, not only on account of the pain which it gives to the patient, but because the very act itself may be the means of injuring the continuity of tissue, and of producing such serious mischief as perforation of the peritoneum, or rupture of abscess, etc., into its cavity. For the same reason (the risk of mischief), it is well not to repeat this mode of examination unnecessarily. Occasionally the entire hand must be used, but mostly it is sufficient to employ the palmar surface of the last joint of the fingers, which should be first smoothly applied to the surface, and then depressed perpendicularly to it. The tips of the fingers are apt to give pain, but sometimes we cannot avoid using them.

28. Where there is great tenderness of the abdomen and mucous passages, Dr. Simpson * recommends that *the patient should be placed under the anæsthetic influence of chloroform* previous to examination. I need scarcely observe how cautious we should be in following this practice, although, no doubt, there are cases in which it is the only means by which the full benefit of palpation and percussion for purposes of diagnosis can be obtained. Anæsthesia, however, we must recollect, may remove the only safeguard the patient possesses against injury from our manipulations, not only because it deprives us of all warning of our approaching tissues on the verge of disorganisation, but also because it may tempt us to employ more roughness in our

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* Edinburgh Monthly Journal, vol. xii., p. 172.

examination than we should do were the patient sensible of pain. In those cases where the tenderness arises chiefly or entirely from nervous causes, hysteria or spinal irritation, and the condition of the thoracic organs does not interfere with its use, less evil is to be feared in this respect than where the tenderness is the pure result of local disease; in this latter case it appears to me doubtful whether it should be used at all. An objection to anæsthesia for the purpose of making a vaginal or rectal exploration, unless with the full consent of the patient after explanation, and in the presence of a friend, naturally occurs to the mind.

Results of Palpation in Health.

29. Many of the points which inspection displays in the natural or morbid conformation of the trunk are also capable of being ascertained by passing the hand over the surface; such as its general form and size, and the most remarkable of the elevations or bulgings which it presents. Palpation then becomes not only confirmatory of its indications, but, where the patient cannot or will not be exposed to inspection, may to some extent replace it. The wall of the abdomen readily yields to the pressure of the hand, but yet offers such an amount of resistance as gives the idea of a certain thickness. It is elastic also, readily, and with a certain degree of force, following the hand as pressure is withdrawn. The resistance opposed to the hand is rather greater a little way below the xiphoid cartilage than elsewhere, its extent varying with the extent of surface over which the *liver* is in contact with that part of the parietes. With this exception, nothing can be felt of the liver, unless the fingers can be made to reach behind the margin of the ribs. In thin subjects, with a lax abdominal wall, this can sometimes be accomplished, the tips of the fingers coming in contact with the margin of the organ, if sufficiently low. It is only under similar circumstances that the lower extremity of the *spleen* can occasionally be felt in health. The *kidneys* are, in consequence of their depth, and of

the various organs which intervene between them and the anterior parietes, difficult to feel in their healthy state. The muscles of the abdomen must be efficiently relaxed, and strong pressure be made in their direction; the overlying intestines being pressed aside as much as practicable by a circular movement of the hands during the process of palpation, which may be assisted, if much difficulty is perceived in arriving at them, by counter-pressure from behind. Their anatomical position must be kept in memory, as it is not uncommon to see persons unskilled in searching for them groping with their hands at far too low a level. They are, if at all, to be discovered by the side of the vertebral column on the level of the lowest ribs, and then it is only their lowest part that can be felt. In thin persons, pressure to the left and a little above the umbilicus will often enable us to feel the *pulsations of the aorta*, especially where the lumbar curve of the vertebral column is great. The *bodies of the vertebræ* may be occasionally felt in such subjects. In females who have been much compressed with stays, the organs are often so greatly displaced, that the liver, spleen, and kidneys, can be felt without difficulty in the new position into which they have been forced.

Physical Signs derived from Palpation in Disease.

30. *The resistance offered by the parietes to the pressure of the hand may be greater than natural.*—This is a sign which may be present over the whole surface of the abdomen, or only locally. Its causes are the following—(*a*) Increased rigidity of the abdominal wall at the part examined, resulting from muscular contraction induced by the fear of pain, or arising instinctively in connexion with painful disease at some part behind the spot at which it is manifested. (*b*) Rigidity of the abdominal wall, occasioned by organic changes in the tissues composing it. (*c*) The presence beneath the spot examined of some physical obstacle to the depression of the wall, such as an enlarged solid organ, a tumour, collections of fluid or gas which are

prevented from being displaced by their abundance or circumscription, etc.

In connexion with this sign, a *sense of thickening of the parietes* is also sometimes perceived. That a thickened state of the parietes is actually present, may sometimes be ascertained by grasping a fold of them between the fingers or between the hands. The cause of the thickening may thus, too, sometimes be ascertained, by the sensation which the included part imparts to the touch.

31. *The resistance to pressure may be diminished.*—This sign may arise from actual diminution of the muscular tension of the parietes, from thinning of the tissues, or from lessened resistance of the parts behind the wall. The only instances in which I have noticed its connexion with intraperitoneal disease have been in gaseous accumulation in the digestive tube, or within the cavity of the peritoneum. This sign may be accompanied by a *sense of thinning* of the abdominal wall.

32. *Increased elasticity of the parietes* on pressure may be observed generally or locally. It is due to an accumulation at the spot examined of the most elastic of the abdominal contents, namely gaseous matter. The gas may either be accumulated within the digestive tube, or be effused into the peritoneal cavity.

33. *The elasticity of the parietes may be diminished*, generally or locally.—This sign is observed where there is less than the usual amount of gaseous matter in the digestive tube, or where the gaseous contents of the abdomen are replaced by liquid or solid substances either in the tube itself or external to it and displacing it.

34. *Tumour* is discovered by its resistance to pressure, contrasting over a certain space, and at a certain depth, with that manifested at other parts, and at other depths of the abdomen. It may arise either from extension of known organs by increase in size or detrusion beyond their customary limits; or from thickenings or growths connected with organs, which, in health,

do not interfere with the natural feel of the abdomen; or from solid or circumscribed liquid or gaseous accumulations external or internal to the digestive tube or other viscera. In other instances, the deposition of various matters, the result of organic change, etc., in the abdominal wall itself, is the cause of the sign. In seeking to define the limits of tumour, it is well to commence our palpation at a part to which it is unlikely to have extended, and to approach by degrees its supposed margin. By this mode the spot at which resistance commences is readily perceived, often much more readily than its point of termination, by examining in the other direction. In some cases, where the wall is lax and atonic, as after the operation of tapping, the fingers can be made to embrace more or less perfectly any solid body within reach, so as determine its size and boundaries with the greatest accuracy. When there is much fluid accumulated in the peritoneum, the ordinary mode of feeling for internal organs or tumours cannot be adopted, and in such cases on applying the fingers to the surface, and then making *sudden deep pressure* with them, a tumour may often be felt to strike against them. The possibility of doing this is in itself a sign of the presence of liquid between the wall and the organ or tumour felt. The extent, and even other points respecting the liver, spleen, and abnormal tumours, may often be determined in this manner. The points of importance to determine respecting a palpable tumour are the following: 1. Its *situation* and depth from the surface, which often is in itself sufficient to reduce the number of organs or tissues which may give rise to it, within narrow limits. 2. Its *form:* this is observed by passing the hand over its surface, and around its boundaries, and is sometimes very distinctive of some known organ of the abdomen. Too much stress, however, must not be laid on this sort of recognition, since a morbid growth sometimes assumes very closely the form and outline of natural organs. 3. Its *surface*, which may be smooth or irregular, nodulated or lobulated, is to be observed by causing the abdominal wall, or the looser part of it, to slide in a circular manner over the enlargement. When a tumour is ascertained to be intra-abdominal, nodulations felt upon its surface, or extensions from its edge are not hastily to be assumed to belong to the tumour itself, since it must first be determined by their form, direction, mobility, etc., that they do not belong to some overlying portion of the abdominal wall. 4. Its *size* is estimated by tracing out its boundary in each direction by the fingers, making due allowance for the thickness of the abdominal wall; this must be done so as to ascertain that no deeper portion exists beyond its superficial boundary. Its size may be measured after this definition of its boundaries by the tape or rule. When tumour is deeply seated, its limitation by the hand often gives a very imperfect idea of its actual size, which after death proves much greater than was supposed. The determination of its size is especially interfered with by flatulent distension of the digestive tube, or by ascites. 5. Its *consistence:* its degree of hardness or softness may be observed by noticing the sense of resistance or yielding which it offers to the pressure of the hand, taking care to employ counter-pressure if possible at the same time, so as to fix the part under observation. Hardness is not a necessary proof of solidity, as it may exist to the extent almost of boniness in tumours containing liquid, even when the cyst is not remarkably thick or rigid: nor on the other hand, is its softness a proof that it is not solid, inasmuch as fatty and encephaloid masses have both more or less of this quality. Sometimes a tumour subsides under the pressure of the hand. 6. Its *elasticity* is noticed by the freedom and force with which its surface returns to its original position after depression by the finger. The greater degrees of elasticity are characteristic of liquid and gaseous tumours, those which are most dense and solid being least elastic. Some tumours, however, containing liquid, may be so resistant, that their elasticity cannot be tested, because their wall cannot be depressed. A false sense of elasticity may be presented by an inelastic tumour from the depression of the entire mass, if small and of flattened form, against some highly elastic matter posteriorly, such as the digestive tube filled with gas. 7. The *mobility* of a tumour may be tested in two ways; either the force of gravitation may be used by altering the position of the patient from the erect to the recumbent, the supine to the prone, or from one side to the other, and noticing whether the tumour falls over in accordance with it towards the most dependent spot; or else by endeavouring to move the mass by means of the hand upwards, downwards, or laterally. If moveable, it must be noticed whether the abdominal wall moves along with it or not. True moveableness of a tumour indicates either that it is unadherent, or only adherent by long adhesions, or else that it is attached to, or impacted in some moveable part. Immobility on the other hand, shows either that the tumour is so large that space to move in is wanting, or else that it is impacted in, or adherent to some part from which it is attempted to remove it. The test may be applied either between a tumour and the abdominal wall; between a tumour and the solid framework of the thorax, pelvis, or vertebral column; or lastly, between a tumour and a known solid organ, or between two or more tumours co-existent in the abdomen. 8. Its *weight* is appreciated by the amount of force required to move it when moveable, or to sustain it, when by placing the patient in a proper position it is made to rest upon the hand. Great weight indicates solidity, or a large collection of fluid in the tumour; lightness indicates a gaseous character in its contents. 9. The *connexions* of the tumour are to be noticed by observing the continuity of its resistance, and of its felt surface and boundaries with those of solid organs capable of being felt. It is to be observed also whether the two are moveable together, or independently. A tumour may be connected with any organ or part, not only by organically arising in it, but by reason of adhesion, the two having otherwise no relation to one another. A resistant state of the abdominal parietes, from the causes before enumerated (30 *a. b.*), interferes greatly with the determination of all the above characters of tumour, and until it subside or be removed it becomes impossible to ascertain sometimes even the existence of tumour at all. The operation of enemata and cathartics will sometimes remove a tumour, and throw all the necessary light upon its nature, when it originates in accumulation of any kind within the colon.

35. *The mobility of the abdominal parietes is sometimes lessened*, or they may become quite immoveable and fixed over the organs, or over tumours subjacent. It is tested by attempting to gather up the abdominal wall by the hand, and to slide it over the subjacent surface or organs. In some cases where this is impossible and the deeper portions of the wall appear fixed, the more superficial layers may be freely moved upon them. This sign occurs either from muscular rigidity of the wall, great distension of parietes, considerable retraction, or adhesion to subjacent parts.

36. *Sense of movement* beneath the hand may sometimes be experienced when it is laid smoothly upon the abdominal surface. Sometimes the movement is one of *gradual expansion*, which may at length attain a maximum of extent, and then be followed by a *sense of subsidence*. This occurs where gaseous matters accumulate in some portion of the bowels, in which case visible fulness accompanies the elevation. In other instances, the movement experienced has a vermicular character, giving a sensation of creeping or writhing under the hand. This may have a double source, either resulting from contraction of the abdominal muscles irregularly excited by some cause of irritation, as by a tumour behind the wall; or it may arise from the movements of the intestines themselves, whose walls are adherent to the abdominal peritoneum, or rendered tense or thickened by disease. Another kind of movement resembles more closely the movement of a solid body within the abdomen, giving an impulse quick and sharp to the hand as it lies upon the surface, or it is like a solid substance sliding over the surface with more or less pressure, or in the least degree like a fluttering movement. All these signs may arise either from contractions of the muscles of the abdominal wall, or

from bodies of gas passing from one part of the intestines to another; or lastly, from actual movements of a fœtus within the uterus, or external to its cavity.

37. *Gaseous vibration* is a term which may be applied to sensations which are imparted to the hand when, either during the presence of borborygmi, or on pressure, gas is made to pass through an inefficient space from one portion of intestine to another. The sensation may be one of a croaking character, or it may be bubbling or *gurgling:* in most cases these sensations are accompanied by sound audible at a short distance from the patient. The gurgling vibration indicates the conjoined presence of liquid matters.

38. *Sensation of friction.*—This is referable to a want of smoothness in the opposed surfaces of the peritoneum. It has been variously described as "a soft, creeping, or gentle vibration under the hand," as like the sensation given to the "finger rubbed over a pane of glass." The more intense degrees have been likened to "creaking," "crepitus," and "grating." It is usually perceived during the movements impressed on the abdominal organs, by the action of the diaphragm in respiration, sometimes being limited to the inspiratory act. In other cases the pressure of the hand is necessary to elicit it. It rarely arises independently of one of these sources of motion, but has been observed in connexion with the peristaltic movements of the intestines alone. It then corresponds in character with these motions; being "continuous," "creeping," and "rustling." The phenomenon is more marked, and less dependent on artificial pressure, where it occurs over the seat of solid organs or abnormal growths and thickenings, than where it is due simply to a roughened state of the peritoneum of otherwise healthy intestines. The friction which accompanies the peristaltic movements must not be confounded with the sensation arising from the passage of gas.

39. *Crepitation or grating* is only perceived on motion being imparted by the hand. The sensation is similar to that of

pressing together a number of small hard bodies in the hand, and it is either a sign of a similar accumulation within the abdomen, or arises from gas passing in bubbles through narrow apertures. It is to be sought in the regions of the gall-bladder and kidneys; sometimes it is referable to accumulation of hard bodies in the intestinal tube, to intestinal perforation or to emphysema.

40. *Fluctuation.*—To perceive general abdominal fluctuation, one hand should be laid evenly upon the surface, while an opposite part is sharply tapped with the fingers of the other. The sensation given is that which would naturally be referred to the impulsion of a series of waves upon the hand. The fineness of the undulations will depend on the tenseness of the wall, and in some degree upon the thin character of the contained fluid. It is difficult to perceive fluctuation where the wall is loaded with fat, where the peritoneum or cyst containing the liquid are greatly thickened, or there is much serous infiltration beneath the integument. In the latter case acupuncture will often reduce the thickness of the wall, so as to allow of this sign being ascertained. An infiltrated state of the wall itself gives rise to a kind of fluctuation, especially when light manipulation is employed and the wall is struck obliquely. The interval of time which elapses between the stroke and the sensation of fluctuation varies with the thickness of the fluid and the flaccidity of the wall, the latter being modified not only by the quantity of liquid present, but also in certain cases by the amount of gaseous intestinal distension. Where the quantity of fluid is small, it has been recommended to apply the two hands to the surface to be examined, separating them only by an interval of two or three inches, in such a manner that the two index fingers shall be parallel, and confront one another by their external edges: if then light blows be given to the wall by the right index, the undulatory movement will be perceived by the left. Valuable information is gained by observing the variation of this sign as to position and clearness, with alterations in the

posture of the patient, as well as the extent of its conduction in different directions. Moveableness of the seat of fluctuation indicates that the liquid causing it is so situated as to be free to move between the two points, and consequently that the cavity containing it is uninterrupted between them. For the most part fluctuation results from the presence of fluid beneath the abdominal walls, but not constantly. Gelatinous matter, either free within the cavity of the abdomen, or encysted, imparts a sensation not distinguishable from fine fluctuation; and a similar sensation has been more than once imparted to the hand by an enlarged spleen. A little care, however, readily distinguishes this last phenomenon from the fluctuation arising from the presence of liquid. When collections of matter occur within the abdomen, and point like an ordinary abscess at the surface, fluctuation is to be detected by the alternate movement of the fingers adopted by the surgeon when he suspects its existence in other soft parts of the body. Fluctuation may arise either from the presence of fluid within the abdomen, or in some of the tissues of the parietes external to the peritoneum.

41. *Repercussion*, or "*ballottement*," is a sign obtained by placing the patient with the abdomen dependent, and making sudden and brisk pressure with the extremities of the fingers; a sensation is perceived as of some body having left the portion of the wall at which the test is applied, and shortly it is again perceived to fall upon the hand. In order to obtain it, there must be present a hard substance and abundance of liquid surrounding it, the former being free to move in the latter, and small enough to be readily thrown up by the finger.

42. *Pulsation.*—The pulsatory movement of the large vessels of the abdomen is mostly lost to the touch, as well as to the eye, before reaching the surface. The pulsation of the aorta, however, may be felt on deep pressure over its course, especially in persons of spare conformation or emaciated by disease. In some cases of disease it is very manifest, extending sometimes even to the femoral arteries, which then beat with increased

force. Its seat, extent, abruptness, or expansile force, direction—whether merely elevating the hand, or presenting lateral expansion also—and its degree of permanence, are all to be observed in any endeavour to estimate its cause and semeiological value. A pulsatory sensation at the epigastrium, below the ensiform cartilage, often occurs in connexion with thoracic or cardiac disease. When it occurs in connexion with palpable tumour, it may consist in an aneurismal swelling of the artery itself; in a tumour, either of the wall or within the abdomen, lying upon a large artery; or in a tumour lying upon or behind a large vessel, such as the aorta, whose pulsation it transmits or elevates nearer to the surface. When a tumour lies upon the aorta and receives pulsation from it, the pulsations will be entirely, or almost wholly, in the perpendicular direction, little, if any, being perceived laterally, and the smaller the tumour, the more perfect and marked is the pulsation. If the tumour can be pressed on one side from off the vessel, or caused to gravitate from it by placing the patient on the hands and knees, the pulsation in it ceases to be felt. The characters of aneurismal pulsating tumours, and of tumours behind and elevating the aorta, will be described hereafter. One of the arterial branches from the aorta may cross the surface of a tumour, lying between it and the abdominal wall; in this case the pulsation will be confined to its course.

43. *Thrill* is a sensation which has been compared to that which is perceived by the hand placed on the back of a cat while purring, and may be observed as an accompaniment of a felt pulsation, or independently of it. It may be intermittent, corresponding then with the arterial pulse, or continuous. Its physical cause is a rippling character imparted to the current of the blood by some obstacle to its free progress. It is not a necessary indication of disease in the vessels; nor, where this exists, is it a measure of its amount, since a moderate degree of pressure will elicit it in a patient with healthy vessels whose blood is poor (*spanæmia*); and this same condition of the

circulating fluid will exaggerate its intensity when it arises in connexion with disease of the vessels. A thrill may arise, however, independently either of a morbid state of the blood or vessels—as shown by Dr. Swett—from friction of the heart upon a tuberculated liver.

Signs having reference to the position of the Diaphragm and Thoracic organs.

44. *An altered seat of impulse of the apex of the heart.*—The usual displacement is upwards, and more or less to the left. This arises from the displacement of the organ by some of those diseases of the abdomen which elevate the left arch of the diaphragm by the pressure which they exercise upon it from below. In rare instances the displacement is to the right, as where the left side of the thorax is occupied, from hernia of the diaphragm, with abdominal organs.

A diminished downward extent of the tactile vocal vibration.—In certain diseases which raise the diaphragm and compress the thoracic viscera, the vocal vibration, as perceived by the hand, is not observed to extend as low as is customary in health. This sign may occur on one or both sides, according as the cause which elevates the diaphragm is general, or confined to one section of the abdomen.

Exploration of the Pelvis.

45. It has been remarked (2) that certain organs which in advanced disease exhibit signs which are ascertainable by physical examination of the abdomen, occupy in health a position in the pelvis which prevents their being explored through the soft parietes of the belly. It consequently becomes sometimes essential to the diagnosis of their diseases to make use of palpation through the lower aperture of the pelvis, by the introduction of the fingers into the canals of the rectum and vagina. It will therefore be necessary to make a few brief observations on these modes of examination.

Examination by the vagina.—For most purposes the best position for the patient is the supine, the physician standing on her right side for the facility of using his right hand in the examination. The index finger is mostly sufficient, but sometimes both that and the middle finger are requisite: they should be well greased, and slowly and carefully introduced. The fingers being introduced, the elbow should be depressed, so as to allow of their being carried in the direction of the axis of the pelvis. Another mode of insuring the correct direction is to introduce them by passing the hand first beneath the raised right thigh of the patient. The obstetric position upon the left side, adopted by some practitioners from motives of delicacy, is open to many practical objections, the most serious of which is that the back of the finger comes in contact with the anterior part of the vaginal wall, and there is so much difficulty in turning it, that signs of disease on that side may easily escape detection. It is often desirable, however, to make the examination of the patient while standing, as for the detection of "*ballottement*" in pregnancy, or when the weight of felt parts or organs has to be estimated. Pressure with the unoccupied hand may sometimes be advantageously employed above the pubes, either to bring the parts more readily under examination by depressing them in the pelvis, or, where tumour is felt in both situations, to estimate its size, connexions, etc., by grasping it between the two hands, the one below and the other above, and to ascertain the possibility of impulse or fluctuation being conducted from one to the other. This, however, often demands the depression of the hand far down behind the pubes, which, although readily effected after labour, or in females with lax abdominal walls, requires in many that the shoulders should be considerably raised, and the thighs well flexed upon the trunk. The rectum and bladder should be evacuated prior to vaginal examination, so as to avoid the fallacies which might arise from their distension, and to admit the more ready employment of pressure in various desired directions.

In the normal state, the attachment of the vagina into the neck of the uterus is readily reached. The cervix uteri is perceived as a somewhat conical projection beyond the line of attachment, of about $\frac{1}{4}$ to $\frac{1}{2}$ an inch in length, firm, and presenting at its apex a transverse depression bounded by a firm lip anteriorly and posteriorly. The actual distance from the vulva varies in different females, and in the same female at different times of the day, being higher in the morning and lower in the evening. The vaginal wall allows of pressure being exerted in all directions, without resistance, by the finger within the canal, whether laterally by the sides of the uterus, or upwards from the cul-de-sac in front of or behind its attachment to the cervix. The cervix is capable of being moved, and with it the entire womb, by the pressure of the fingers.

46. In the performance of *vaginal examination in disease*, the same objects should be had in view as in palpation of the exterior of the abdomen, namely,—to ascertain the position, extent, form, weight, consistence, and mobility of all organs and morbid structures which the finger is capable of reaching. Once the finger is in the vagina, the examination should be proceeded with leisurely, so that no imperfection in it should render necessary its repetition on a future day: a hurried exploration is rarely productive of any useful result.

The points to which attention should particularly be paid, have reference to the os and cervix uteri, the body of the uterus, and the contents of its cavity, the vagina, and the characters of any tumour or resistance felt through its wall. 1. (*a.*) The *os and cervix uteri* may be altered in position by disease. They may be *depressed* to a lower level than customary, either by enlargement of the entire organ, or by its descent in the pelvis in consequence of increased weight, relaxation of the vagina and uterine ligaments, or pressure exerted upon the upper part of the organ by some abnormal growth above it. They may be *elevated*. The elevation may be due either to the organ rising from the pelvis into the abdomen, in consequence of its size being greater than the pelvis can accommodate; to its being pushed upwards by a morbid growth or accumulation in the pelvis; or, lastly, to its being drawn up by a tumour of another organ, as it rises out of the pelvis, in consequence of the connecting substance being too short to allow of their occupying, the one a position in the abdomen, and the other a position in the pelvis. The os uteri may be raised so high as to be incapable of being reached by the finger. They may be placed more *to one side* of the pelvis than natural. This may be due either to traction towards that side by shortening of the tissues connecting the organ with the side of the pelvis, to an oblique position of the organ in general, or to detrusion by a tumour or growth occupying the opposite side of the cavity. They may be placed more *towards the anterior part* of the pelvis than natural, and even lie closely behind the pubic symphysis. This results either from such an inclination of the uterus as brings the lower part of the organ forwards, or to growths, accumulations, or tumours lying behind the uterus and pushing it forwards. Their position may be *more posterior* than natural, a change which may be due either to such an inclination of the organ as throws back the lower extremity of the uterus, or to some enlargement of parts anterior to it, forcing the uterus in this direction. (*b.*) *The inclination of the axis of the cervix* may be altered, so that the os uteri looks in one case unnaturally forwards, or forwards and upwards; in another, unnaturally backwards, or backwards and upwards; and in a third case, towards one side of the pelvis. (*c.*) *The size and shape of the cervix* may be altered. In some cases it is shortened, or even entirely lost to the finger, not as the result of ulceration, with which we have here nothing to do, but in consequence of increased development of the body of the organ, and expansion of the lower segment of its cavity; in other cases it is either elongated or enlarged in breadth, a change which is commonly accompanied either by induration or softening. (*d.*) *The condition of the os uteri*, also, may be altered. It may be open, admitting the tip of the finger to pass into the canal of the cervix, or it may be closely sealed. Its form may be changed from that of a transverse slit to an oval or rounded depression, or it may be so altered in its characters as to be scarcely recognisable, or may be altogether lost to the touch. 2. Several changes may be noticed in the *body of the uterus*. The most important of these are connected with its enlargement, and the *development of its inferior segment*, as traceable by the finger carried upwards around the base of the cervix. This enlargement may be perceived in front, behind, to one side of the body, or in the entire circumference of it, according to the nature of the disease: when only discernible in one direction, its origin in the uterus is sometimes so doubtful, that it is better to class it among tumours felt through the wall of the vagina. Its resistance and elasticity should be observed, and the form of any solid body perceived within it should be noted. The weight of the organ should be ascertained, as well as its fixedness or mobility. *Immobility* of the uterus may be due either to adhesion of the organ or to its impaction in the pelvis, from disease in its appendages, or tumours or accumulations above it or in the cavity of the pelvis. While the finger is upon the developed body of the uterus, other signs should be sought for: one is vaginal *re-percussion* or "*ballottement*," ascertained by sudden pressure with the finger, when a resistant body will be perceived to rise from the part pressed, and shortly to fall again upon it like a light ball. By using *simultaneous pressure above the pubes*, the continuity of tumour felt in the abdomen (34) with the uterus, and the transmission of fluctuation, may sometimes be observed. 3. When the uterus admits the finger into *its cavity*, further signs of disease may be ascertained. The most important of these is *tumour*, which, either regular or irregular in form, may sometimes be perceived, either confined to the uterus or passing through the os uteri into the canal of the vagina. In either case, the finger introduced can ascertain the consistence, form, and sometimes the attachment of the tumour to the cervix or interior of the body of the uterus. The error must, however, be avoided of mistaking an inverted fundus for a tumour in the cavity, by making an examination through the rectum, and noticing the form of the upper part of the uterus. 4. Several changes may take place in the dimensions and direction of the *vagina*. Where the os and cervix uteri are raised, the vagina is *elongated* also, and narrowed at the same time; and when depressed, the canal is *shortened*, while its width is increased; or it may be more or less inverted. The *direction* of the vagina is altered in correspondence with the altered position of the uterus, and its displacement forwards, backwards, or towards either side of the pelvis. 5. The wall of the vagina may be bulged inwards in any part by enlargements or accumulations external to it; or, by pressure of the finger in different directions, *resistance* or *tumour* may be perceived. The position, extent, form, surface, consistence, elasticity, mobility, weight, and connexions of these, the presence of fluctuation and their continuity with felt tumour in the abdomen, are all to be noticed in any attempt to determine their nature. The effect of labour pains and of efforts at micturition on the tumour, sometimes throws light upon its character.

47. *Examination by the rectum* may be made in the same manner as that by the vagina, or the patient may be placed upon the side, or kneeling as, for instance, upon a chair, with the trunk bent forwards. The finger should be well lubricated, and slowly introduced through the sphincter. This may be relaxed by requesting the patient to bear down, and the tip of the finger being then applied to the anus, it can readily be made to slip up during the subsequent contraction. By this mode of exploration, the organs and growths at the posterior side of the pelvis can be felt, as well as those anteriorly. In some subjects the ovaries can be felt; this, however, is rather the exception than the rule when these organs are in their normal position and of their normal bulk. The finger can of course feel any resistance within its reach, arising from constriction of the canal of the rectum, or the presence of any fæcal accumulation or

foreign substance in its cavity. In some cases useful information is gained by the simultaneous use of the finger and thumb, the former in the rectum and the latter in the vagina; intervening structures may thus be grasped between them, and their character and nature more fully ascertained. Where pelvic tumour is perceptible, as well as tumour in the abdomen, their continuity can be ascertained and the size of the mass estimated by simultaneous pressure above the pubes.

48. Much as it has been abused, too, there are cases in which the employment of Simpson's *uterine sound* is indispensable for arriving at a correct diagnosis.* When necessary, it should not be paraded, as the introduction of an instrument of any kind into the vagina is especially repugnant to the feelings of the patient. Being warmed by placing it up the sleeve, or by moderate friction with the hand, the opportunity of the fingers being in the vagina should be taken for its use, if it should, after other examination has been made, appear desirable. The point of the instrument must be guided by the examining finger to the os uteri, when gentle pressure will enable it to enter the cavity of the cervix. The points which are to be ascertained by it are, the length of the uterine cavity and its direction, the mobility of the womb, and thus its attachments to other structures or organs within the simultaneous reach of the examining finger, of the finger placed in the rectum, or of the hand above the pubes. The thickness of the wall of the uterus may often thus be estimated at the spot which corresponds to the extremity of the sound. Accidents have arisen in connexion with its employment, and even metritis has been said to have been occasioned

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* My own experience leads me to the conclusion, that although there are circumstances under which the use of the sound is *indispensable for diagnosis*, yet that these are of *rare* occurrence. Whilst, therefore, I protest as strongly as any of the opponents of this instrument against its indiscriminate employment, I believe that we are justified in its e when a correct diagnosis is essential, and the customary means of ving at it have afforded insufficient data.

by it: I have met with none of these, however, in my own practice. It need scarcely be said that the suspicion even of pregnancy must decidedly negative its employment, and that when used all roughness of manipulation must be most carefully avoided.

PERCUSSION.

49. The *sound* emitted on striking sharply any portion of the body varies with and indicates its physical condition. Immediate percussion, though adapted sometimes to the exploration of the chest, cannot be employed over the laxer parietes of the abdomen, partly because the wall is not sufficiently tense to vibrate readily in this manner, and partly because the process itself would be productive of considerable pain. Mediate percussion can alone be used; and the sound produced by striking upon the pleximeter will vary with the physical state of the organs and parts which lie beneath that spot on the parietes to which it is applied, and the readiness with which they admit of or damp the sonorous vibrations. But, in addition to the sound observed, the percussing fingers perceive *variations of resistance* or yielding which are calculated to impart valuable information.

Mode of percussion.—The most convenient pleximeter is the middle finger of the left hand, smoothly applied by its palmar surface on the part to be percussed. It is convenient, because it is always ready for use, and because it is capable of accurate adaptation to any part of organs or tumours which palpation can discover at any depth in the abdomen. In some cases, percussion on the finger gives pain to the patient, while none is complained of when a pleximeter is employed. Perhaps the best is the ordinary thin plate of ivory; but care should be taken not to apply it to the surface cold, since this is likely to occasion involuntary muscular contraction. The stroke is made, in most cases, with the tips of the two or three first fingers brought to a level, or with only a single finger. It should be made sharply and quickly from the wrist; and, when the sense of resistance is to be tested, the fingers should be allowed to dwell longer on the pleximeter than when the sound alone is to be ascertained. Percussion may be strong or gentle; in the latter case, the stroke may be made by filliping gently upon the back of a single finger, or upon the nail. By gentle percussion, a sound is elicited whose character will depend upon the condition of the wall, and of the parts immediately beneath it; whereas, when it is forcible, the deeper tissues will modify the result. By noting the variations of sound occasioned by varied strength of percussion, a rough idea may be formed of the thickness of solid organs where parts which lie beneath them are qualified to alter the note. The position of the patient may be the same as for palpation (27); and it is often necessary to vary it, in order to ascertain whether the sound can be altered by favouring gravitation towards or away from the part percussed. The muscles of the abdomen must be relaxed, especially when the deeper structures are to be reached. The position of the observer of course must be guided by convenience; awkwardness alone has to be avoided.

Results of Percussion in Health.

50. The sounds elicited by percussion are due to the sonorous vibrations of the wall, to echoes originating in the cavity or cavities subjacent, or to the agitation of matters which the cavities contain. 1. As regards the first class of sounds, we find the simple varieties of dulness or resonance. (*a.*) The sound is *dull* when the vibrations of the parietes are prevented by their thickness, or by the presence of solid parts, organs, or growths beneath the part percussed; and the same damping of sound is produced by the presence of liquids. There is every degree of variation to be perceived between absolute dulness and resonance. (*b.*) It is *resonant* when organs or parts containing air or gas are subjacent to the part percussed. The pitch of the

resonance varies with the degree of tension of the wall, and with the size of the subjacent cavity. The tenser the wall and the smaller the cavity, the higher will be the pitch of the percussion sound, and *vice versâ*. When the vibrations are very free, prolonged, and drum-like, the sound is termed *tympanitic*. 2. The occurrence of echo from the walls of a cavity constitutes an addition to the resonant sounds. This addition has a *metallic tinkling* character, from which it has derived its name. When the cavity is large, the combined sound thus arising is termed *amphoric*, and may be imitated by filliping the cheeks after inflating them. When gas and liquid are conjoined in the cavity, the latter may be so far agitated as to give rise itself to a sound, which being, along with the sound of the wall, echoed within the cavity, constitutes altogether the "*bruit humorique*" of Piorry. It is not always easy to distinguish this from a high development of the metallic tinkling, independently of the presence of liquid. This sound may be imitated by the well-known experiment of closing the hands so as to include a hollow space, and striking them upon the knee, the air being allowed to escape through a narrow chink between the fingers.

51. *Percussion applied to the liver.*—Percussion over the seat of the liver produces, on account of the solidity of that organ, a dull sound, continuous and uninterrupted over a space corresponding with the extent of contact of the organ with the wall of the abdomen. *Gentle percussion* will elicit it over the whole surface of contact; and, by filliping gently upon the nail, the boundaries of the dulness may be very accurately determined. The line of its upper boundary has been already described (2), as passing horizontally backwards from the lower extremity of the sternum: it is even and unbroken. The dulness of the left lobe extends about an inch and a half or two inches to the left of the median line: in females who have been much compressed by stays, it extends much further in this direction. Its downward extent varies considerably; over the right lobe it measures mostly about four inches, in some cases reaching the margin of

the ribs in the vertical line of the nipple, at others, not extending so low. In the middle line its extent downwards varies from an inch and a half to three inches. Examined behind, the dulness on gentle percussion rises to about the eleventh intercostal space. The lower edge of the hepatic dulness is bounded by the resonance of the colon (55), the upper edge by that of the lung, and the dulness of the left lobe by the resonance of the stomach (54). In children, the extent of the superficial dulness, from the proportionately larger size of the organ, is greater than in adults.

To determine the level to which the summit of its convexity rises, the percussion stroke must be strong. The pulmonary resonance noticed by gentle percussion above the superficial dulness of the liver will then be observed to be deadened; this effect lessening, and the pulmonary resonance becoming purer, till it is perfected at about the level of the fourth intercostal space in front. Posteriorly, the *deep* dulness of the organ rises as high as the eighth or ninth rib. The deep dulness in children does not extend to so high a level as in adults. On using moderately strong percussion from the centre of hepatic dulness towards its lower edge, it is found to shade off gradually into the resonance of the colon; this qualifying the hepatic sound till the clear sound of the hollow intestine is attained. An idea of the thickness of the liver, a little way above the lower margin, may be obtained by the force requisite to elicit a mixture of resonance. Strong percussion also elicits the resonance of the stomach over the left lobe wherever this organ lies beneath it.

When the stomach is full, not only is the percussion sound altered, but the dulness of the left edge of the liver extends to a less distance to the left than when it is empty. Inspiration lowers, in proportion to its fulness, the upward level of the hepatic dulness, both on deep and superficial percussion: the lower edge of the superficial dulness also descends a little. Accompanying the dulness, there is a sense of resistance perceived by the finger, most marked over the region of complete dulness, on deep percussion, and shading off towards the lower margin of the organ.

52. *Percussion applied to the spleen.*—The spleen is another solid organ which imparts a dull sound on percussion in its region, but not so dull a sound as the liver. This cannot, however, be easily circumscribed, unless the stomach and colon be empty; since, from the position of the spleen in relation to these organs, their distension with food or gas very readily modifies the result of percussion, and may even altogether destroy the dulness. The upper boundary of the splenic dulness, when determined under favourable circumstances, reaches the level of the tenth rib posteriorly, but deep percussion must be used in order to reach it through the intervening portion of the left lung. All that part of the spleen which lies below the margin of the left lung imparts dulness on superficial percussion, which becomes continuous below with that of the kidney; a little resonance and diminished sense of resistance sometimes intervening. The vertical extent is about 3½ inches. The lateral extent of the dulness is anteriorly bounded by the resonance of the stomach: it commonly measures about three inches; but both this and the vertical measurement vary exceedingly, from the varying size of the organ.

53. *Percussion applied to the kidneys.*—The dulness imparted to the wall of the abdomen by these organs is to be sought posteriorly. Their upper extent of dulness cannot be accurately determined, in consequence of its being confounded with that of the liver and spleen, which lie here in front of them. The lower extremity, however, is more favourably situated; the dulness of the solid organ contrasting with the resonance of the intestine which is found between it and the crista ilii. The dulness of the right kidney descends a little lower than that of the left. Latterly, its outer boundary is again determinable by contrast with the intestinal resonance. The dulness both of these organs and of the spleen takes a somewhat lower position after a deep inspiration. Both also impart a sense of resistance

to the percussing fingers, which lessens, and at last is replaced by elasticity as their boundaries are approached.

54. *Percussion applied to the stomach.*—The varying condition of this organ, which is sometimes empty, at other times more or less filled with gas and different proportions of solid and liquid food, must necessarily occasion variations in the extent and quality of its sounds, as elicited by percussion. When it is moderately filled with gas, the sound is hollow and ringing, or tympanitic, but not strongly so, and is accompanied by a sense of elasticity; it mostly extends upwards to the level of the xiphoid cartilage, and, on superficial percussion, to the border of the left lobe of the liver; its extent downwards and to the left varies with its degree of distension. On strong percussion, it is perceptible through the dulness of the left lobe of the liver (51) as far as the median line, and the pulmonary resonance has a stomachal quality for an inch or two above the superficial resonance of the stomach itself, especially when the organ is unusually inflated. When it contains but little gas and no food, the resonance on deep percussion over the left lobe of the liver is less marked. Food and drink extend the boundaries of the sounds, and give rise to dulness where they gravitate, and if liquid predominate to humoric sound also. This is the only accurate and indisputable method of determining its lowest margin.

55. *Percussion applied to the colon.*—This, as the percussion of the stomach, varies in its results with the condition of the canal. When containing gas, there is resonance proportional to the distension of the intestine, throughout its course: it is better marked and more like that of the stomach in the right iliac region over the cæcum than in the left, where fæces often accumulate, and produce a dull sound. This, however, disappears after defæcation, but even then the resonance does not equal that over the corresponding part on the right side. On superficial percussion, the resonance rises as high as the lower margin of the liver, at which level it crosses the abdomen. On the left side, its upward extent will depend much upon the size of the

spleen and the state of the fulness of the stomach. A large *injection* thrown up with force will occasion dulness where it fills the canal, and the "*bruit humorique*" where it comes into contact with gas. Percussion made over the sacrum gives a resonant or dull sound, according as the *rectum* is filled with gas or fæcal matters.

56. *Percussion applied to the small intestines.*—The resonance of the small intestines also varies in pitch with the amount of their distension, but is mostly less deep-toned than that of the colon. It may vary over different parts of the surface of the abdomen which corresponds with them. It extends from the colon above to the pubes below, and across the abdomen from the ascending to the descending colon. The small intestines are the most moveable of all the abdominal organs, and thus are capable of having the extent of their resonance affected by a variety of causes which alter their position and extent of contact with the abdominal parietes: they may even lie so completely in front of the colon and part of the liver as to obscure the physical indications of their presence. Over all the parts of the intestines there is a sense of elasticity imparted to the percussing fingers.

Physical Signs derived from Percussion in Disease.

57. (*a*) *The dulness of the liver with its resistance may be altered in position* without alteration in extent. It may be raised to a higher level towards the chest by causes distending the abdomen below it, its upward extent attaining the level of the third or fourth rib in front. It may, on the other hand, be depressed by disease enlarging the contents of the thorax on the right side; such as emphysema or pneumothorax. Either of these changes of position may occur in females as the result of tight-lacing. The depression of the liver can be detected by palpation, but the elevation of it above the natural position into the chest, by percussion alone. (*b.*) It may be *increased in extent.* This may occur in any or in all directions; it may be only downwards or upwards;

or, when there is enlargement of the left lobe, it may occur principally or solely in the direction of the epigastrium and left hypochondrium. In some of these cases the *outline of its upper or lower boundary is less even* than in health. The increase of extent of hepatic dulness may be due not only to enlargement of the liver and its dependencies, but to its superficial contact with the abdominal wall being continued by morbid products or growths in no way connected with this organ, but yet not distinguishable, so far as their dulness is concerned, from enlargements of the liver itself. (*c.*) It may with its resistance be *diminished in extent.* Where the lower margin of the liver is rounded, a fallacy may arise from a portion of the intestine slipping up between it and the abdominal wall. This may be obviated by pressure of the pleximeter below the apparent lower limit of the dulness, so as to displace the intestine and allow of the hepatic dulness below it being arrived at. The same thing may occur, but more rarely, when the liver is perfectly healthy. (*d.*) The *limits of the dulness may be unaltered* by respiration or varied states of the stomach and bowels. This may be due either to the organ being adherent, greatly increased in size and weight, or to causes impeding the descent of the right side of the diaphragm. (*e.*) The *difference of the results of deep and superficial percussion* towards the margins of the liver *may be less than in* the normal state, the conjoined resonance of the stomach or colon not being capable of being elicited at all, or only on using a more forcible stroke than is requisite in health. Accompanying this sign there is increased resistance to the percussion over the same parts. This sign arises either when the margin of the organ is thickened, or when the colon containing the fæcal matter, or other tumour, lies behind it. (*f.*) There may be *resonance,* in place of dulness, over the hepatic region. This may not be a sign of disease of the liver, but of gas between it and the abdominal wall: when it occurs as a sign of liver disease it is mostly limited in extent, not occupying the whole of the hepatic region. It may present the amphoric character and metallic tinkling echo. It is possible, however, that the entire of the liver dulness may be displaced by resonance from changes in the physical state of the liver itself, a case having been recorded in which the entire organ contained air.*

58. The determination of the limits of the *dulness of the spleen* in the normal state is so difficult, that it may well be believed that it is still more so in disease. The following signs, however, are noticeable in respect to it as well as to the liver. —(*a.*) The dulness may be *altered in position*, the organ being thrown by pressure completely out of its natural situation. When the pressure is exerted from above, as in pneumothorax, the dulness is observed lower than usual; and when from below, it is observed at a higher level on the side of the thorax. The position and extent of its dulness is greatly modified in tight-laced females, the dulness occupying a more anterior position. (*b.*) It may be *increased in extent*. This is very readily determined: the increase is mostly manifested downwards and to the right. It occurs sometimes to a very remarkable extent, and sometimes undergoes changes within brief periods of time. (*c.*) It may be *diminished in extent*. This sign is the most difficult to ascertain. The stomach and bowels should be empty when the examination is made, and the patient should be examined in several positions and at various periods of the day before it should be pronounced upon with certainty.

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* Gaz. des Hôpitaux, 1851, p. 93. The case alluded to occurred under the care of M. Piorry. The resonance of the liver was not observed during life: the presence of the gas was not due to putrefaction, and the cause of it is an interesting point for speculation and further inquiry in connexion with M. Bernard's researches upon the formation of sugar in the liver. It is possible, however, that the gas (from decomposition of the sugar by the action of a ferment?) might only have been formed after death, and so would have given no percussion sign of its presence during life. A similar morbid condition, but to a less extent, is recorded in the same volume, p. 158, by M. Notta. Both instances were observed in patients who died from *Variola*, in which disease accordingly the physical sign in question is to be sought.

It may arise not only from a diminished size of the organ, but also from gaseous distension of the stomach and bowels, or from one extremity of the organ only coming in contact with the wall in consequence of displacement from the pressure of stays.

59. (*a.*) The *dulness of the kidney* may be *altered in position* from alteration in the position of the organ, either by pressure arising in disease of other organs or in the abuse of stays. When the organ is pushed downwards there is no resonant interval between its dulness and the crista ilii. Clinically, I do not know how this is to be distinguished from dulness arising from increased size of the organ, especially where the spleen and liver are hypertrophied and their dulness extends unusually downwards. When the kidney is displaced forwards or upwards, palpation discovers it better than percussion. In the case of a female, I once found the left kidney forming a palpable tumour on that side beneath the margin of the cartilage of the last ribs, and the dulness it gave on percussion extending about two inches above them. (*b.*) *Increased extent* of dulness is noticed in the directions downwards and outwards; it may occur upwards also, reaching to a considerable height on the wall of the thorax, sometimes as high as the sixth rib. In cases where the spleen or liver are greatly enlarged, there is an actual impossibility of determining anything by percussion in the lumbar region beyond the presence of these solid organs, from whose dulness that of the kidney is not distinguishable. (*c.*) *Diminished extent of dulness* must occur to a very considerable degree before it can be clinically appreciated.

60. The *resonant note of the stomach* may be variously affected in its position, extent and quality. (*a.*) Its *position may be altered.* In determining this point,—as all others in connexion with this organ,—it is important to be satisfied that the resonance whose characters are being examined is really that of the stomach, because a distended or displaced colon will often simulate its note. This can often only be effected by causing the patient to

drink a quantity of water, or by making the examination when the stomach contains a recent meal, as well as when it is empty. Where a dulness is suspected to be gravitative dulness of matter in the stomach, and the position of it on the wall of the abdomen renders it liable to be mistaken for dulness from other causes, the patient should be made to vomit, or the occasion of spontaneous vomiting should be seized to aid in the determination of the point. It would in this case be succeeded by a resonance. The position of the resonance of the stomach may be altered by causes acting on it from above or from below, or by changes in position and enlargements of other organs of the abdomen. It may thus be placed higher up in the thorax than in the normal state; either in connexion with elevation of the diaphragm, or in very rare instances with hernia through it; or it may be found lower altogether towards the abdomen, its resonance not rising so high as the natural level, or not being discoverable at all over the lower ribs; or it may be pushed so far to the right as that, even in the distended state, its resonance will not reach within a considerable distance its natural left limit. In some cases the resonance of the stomach assumes a more or less vertical direction, being traceable from its upper extremity downwards towards the umbilicus, its transverse diameter being proportionably lessened. This is a sign of that form of displacement of the organ which often occurs in enlargement of the liver, or depression of the whole organ and elongation of it downwards by the pressure of stays. (*b*.) *Increased extent* of stomach resonance may be so great as even to arrive at the lowest part of the soft wall of the abdomen, and the dulness arising from contained matters may be observed here also. On the other hand, it may rise to a considerable height into the chest. In these last cases there is the greatest difficulty in ascertaining accurately its upward extent, in consequence of the pulmonary sound, even on very gentle percussion, being tinged to a considerable distance with the tympanitic resonance of the stomach. It often becomes impossible also in this case to discover any splenic dulness, or even that of the left lobe of the liver. (*c.*) *Diminished extent.* This is normal when the stomach contains little gas or food, and to be pathological it should be noticed under all conditions, and should have a character of greater or less permanence. (*d.*) The *character of the resonance* may be *altered*, and it may become unnaturally tympanitic, as is commonly the case when its extent is increased. The conjoined presence of liquid and gaseous matter also will develope the "humoric sound." The permanence of this sound, as also that of the gravitative dulness, should in certain cases be observed. (*e.*) *Dulness* is sometimes observed to replace resonance in situations where gravitation has no influence, and to be noticeable in all conditions of the organ: it is commonly found towards the pyloric extremity. Here, however, a thickened and enlarged left lobe of the liver may occasion a source of fallacy; but this may be overcome by observing that deep percussion elicits the stomach resonance, which would not be the case were the dulness due to an altered physical condition of the organ itself. The position and characters of the dulness with deep or superficial percussion in different states of the stomach must often be ascertained.

61. The physical signs furnished by percussion which relate to other organs of the abdomen and pelvis, are sought by examination of the several regions of the abdomen, after separating by percussion those organs whose abnormal percussion sounds have just been described. It is, consequently, better in a practical point of view to describe the signs furnished by percussion of the surface of the abdomen, as a whole, than to endeavour to arrange them under the several organs which either naturally lie in contact with the abdominal wall, or attain such a relation as the result of disease. The only sign of disease in a special organ therefore, which I shall allude to here, is the *limitation of the extent of percussion dulness on injecting* with force a large quantity of liquid into the rectum. In cases of obstruction of the large intestine the dulness extends only so far as the bowel naturally pervious, ceasing at the spot where its calibre is

obstructed. Our knowledge of this sign is due to Piorry, and, taken in connexion with an observation as to the quantity of liquid capable of introduction, is one of the best means which we possess of determining the seat of colonic obstruction.

62. *The surface of the abdomen resonant on percussion from the subjacent intestines may be extended* unnaturally upwards, so as to encroach upon the space allotted to the percussion sound of the spleen, liver, and stomach, causing them to assume a higher position with elevation of the diaphragm. Distension either of the large or small intestines will have this effect, as also will any disease arising from the lower regions of the abdomen, displacing the bowels upwards or causing them to occupy either of the hypochondriac regions; or, in rare instances, it may occur from passage of a portion of the colon, or even of the small intestines through an opening in the diaphragm. When the abdominal resonance naturally due to the presence of the intestines is replaced generally by resonance due to occupation of the peritoneal cavity with gas, the same elevation of its upward limit occurs; in this case, however, the resonance mostly replaces also the special sounds of the liver, spleen, and stomach, in consequence of the gas lying between these organs and the abdominal wall.

63. *The surface of the abdomen resonant on percussion may be reduced within smaller limits* than natural. This may be due to a great reduction in the general volume of the intestines in those cases where the bowels are empty, and general abdominal retraction (9) has occurred. It often happens, under these circumstances, that the sounds due to the liver, stomach, and spleen are found extending unusually low in the cavity, especially in the case of females whose waists have been contracted by stays. In other cases the cause of this sign is extrinsic to the intestines, being due either to some damping medium between them and the vibrating wall, or to their displacement in consequence of the development of some tumour occupying the space accorded to these organs. Where the latter occurs it is remarkable into how contracted a space the resonance of the intestines may be compressed.

64. *The resonance of the abdominal surface may be unusually deep-toned or tympanitic.* When this is general over the whole surface and uniform, it may either be due to the occupation of the peritoneum with a large quantity of gas, or to flatulent distension of the colon, or small intestines, especially of the former. When the small intestines are the distended organs, the tympanitic resonance is less uniformly distributed than when the sound arises from colonic distension, while the greatest and most remarkable uniformity is attained from the presence of gas in the peritoneum. Local tympanitic sound arises from similar causes; either the distension of a portion of the colon or small intestine, mostly, if persistent for any time, of the former; or else from the occupation with gas of a limited and circumscribed space of the peritoneal cavity. The locality of the resonance and its direction in the course of the colon, sometimes not only determines that the large intestine is affected, but may also still further determine that the gaseous accumulation is confined to the cæcum, transverse colon, sigmoid flexure, etc. The occurrence of deep-toned resonance above the pubes by no means indicates that the small intestines are the portion distended, even when a resonance more like that of the small intestines lies above it, since the transverse colon, cæcum, and sigmoid flexure are liable to the most extraordinary displacements, and the resonance in the hypogastrium may be due to some portion of the large intestine. In rare cases of colonic distension amphoric resonance and metallic tinkling are observed over some part of the course of the bowel, and when liquid is conjoined, the "humoric sound" may be developed.

65. *The resonance of the whole or of a portion of the abdominal surface may be diminished or replaced absolutely by dulness.*—Under this sign I include every diminution of natural resonance, whether upon deep or superficial percussion. It may be due, first, to alterations in the intestines themselves, emptiness, contraction, thickening, occupation with matters calculated to damp the vibrations of sound, etc.; secondly, to the presence of

tumours or liquid matters, displacing the intestines from their natural contact with the abdominal wall; or, thirdly, to thickenings, tumours, etc., of various kinds in the substance of the wall itself. As respects the last, the dulness may only be observed on superficial percussion, resonance being obtained on making pressure and percussing strongly; but when the thickness of the wall is great, even strong percussion may fail in eliciting an intestinal note. In percussing tumours and thickenings of hollow organs, the difference of the results of deep and superficial percussion must also be observed, especially towards their margins, since sometimes valuable information is obtained by this means respecting the thickness of the deadening medium, the form of the tumour, or the relation which it bears to surrounding organs. The *intermixture of dulness and resonance* over closely-adjoining parts, or the fact of *dulness* being *crossed by a line of resonance,* sometimes throws light on the seat or nature of a tumour. The dulness arising from matters within the colon may sometimes be removed by the operation of enemata and cathartics. When ascertaining the existence and locality of dulness, inquiry should be made as to *whether it changes its place with alteration of the posture of the individual*, since this indicates mobility of the cause of the dulness. In the same way it is often of importance to determine *whether or not the position and limits of dulness are affected by the respiratory movements.* When the acts of inspiration do not affect them, the cause must either be a position of the dulness very low in the abdomen, adhesion of the body producing dulness to the wall either anteriorly or posteriorly, or obstruction to the descent of the diaphragm.

66. Along with changes in dulness and resonance, percussion indicates in all the instances mentioned corresponding *changes in resistance and elasticity.* Another sensation perceived in the act of percussion is that which occurs in certain cases when hydatids have accumulated in any part sufficiently near the surface of the abdomen. It is called the "*hydatic fremitus,*" and has been compared to the sensation perceived by the finger on striking

a mass of jelly, or on percussing the glass of a repeater watch placed upon its back on the left hand. In order to its development, however, the cysts must be in a definite condition; they must be in contact, with just enough liquid between them to fill up the intervals, an excess or deficiency of liquid impairing the perfection of the fremitus, or at last altogether destroying it. This very much diminishes the clinical value of the sign.

Signs having reference to the position of the Diaphragm and Thoracic Organs.

67. *The downward extent of the pulmonary resonance may, from elevation of the diaphragm, be diminished,* on one or both sides, according as the disease which elevates the diaphragm, is one which operates generally or merely upon one side. The pulmonary resonance may extend *unusually low* when general retraction has occurred from an empty state of the hollow viscera of the abdomen. In some cases, as where diaphragmatic hernia has occurred, or an abscess or aneurism has burst into the chest, the space occupied by the natural resonance of the lungs may be greatly limited. The *heart's dulness may be displaced.* The displacement generally occurs upwards, and to the left, from causes raising the diaphragm; but the heart's dulness may be driven remarkably to the right, as in extensive diaphragmatic hernia. It may extend unusually downwards where the diaphragm is lowered in cases of abdominal retraction. The *heart's dulness may be extended* in consequence of rupture of an abscess, or other accumulation of fluid from the abdomen into the sac of the pericardium.

AUSCULTATION.

68. The method of physical exploration which has been last considered, was that which arises out of the phenomena of sound, elicited by striking the surface of the abdomen, and

heard through the intermediate layer of air. The same sense informs us of varieties in the sound produced by the same means when the ear is applied, either immediately or with the assistance of an appropriate conducting medium, to the wall of the abdomen. The ear thus applied becomes cognisant also of other sounds, which other modes of manipulation, by imparting motion, may give rise to; or which originate spontaneously from the respiratory acts, or from the motions naturally occurring in the digestive tube and in the blood vessels. The application of auscultation to diseased conditions of the abdomen is at present, however, but limited, compared with its use in the diagnosis of thoracic maladies.

Mode of auscultation.—The position of the patient must vary with the part which is the object of exploration. When the anterior regions are to be examined he may be recumbent, and when one side is to be examined he may turn over, so as to lie on the opposite. When the back is to be examined he may either stand, or sit up in bed or upon a chair. The observer must suit his position to his convenience. The part to be examined should either be bare, or covered with some light article of clothing which emits no sound on pressure. The ear may be applied to the surface with only this intervention, but more commonly the stethoscope is preferred. For most purposes the ordinary stethoscope may be employed, care being taken that its lip is well flattened outwards, so as to avoid the pressure of an edge upon parts which may be too tender to bear it. For some purposes, as for the appreciation of the sound which percussion elicits, the solid stethoscope is the most applicable, since it conducts well all sounds arising in solids, and avoids the ringing shock which the ear receives from the column of air contained in the ordinary instrument. Referring the reader who desires information on the subject to the original essays on auscultatory percussion,* I shall pass on to the consideration of the results of auscultation as ordinarily practised.

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* Cammann and Clark: New York Journal of Medicine, July, 1840; and L'Union Médicale, June, 1850.

Results of Auscultation in Health.

69. The movements which occur within the abdomen in health, and which alone can by possibility be the sources of sound, are the following—(*a.*) Those of the opposed surfaces of the peritoneum upon one another during the respiratory acts, or the spontaneous or imparted movements of organs on one another. (*b.*) The movements of alimentary or secreted matters, as gas, within the digestive tube, either by the spontaneous action of the canal itself, or as the result of manipulation. (*c.*) The movement of the blood in the vessels. With respect to the first of these, as every provision is made for the easy sliding upon one another of all the organs contained within the abdomen by covering them with a smooth and slippery membrane, so, as the result of the same contrivance, are these movements effected without sound. The passage of matters, however, into and through the digestive canal is not so completely deprived of friction, and thus, also, not performed without sound.

On applying the stethoscope over the *stomach*, food and drink may be heard to enter it as low as its most depending part. When the stomach contains liquid and gaseous matters, a variety of gurgling or churning sounds are heard from their commixture, which sometimes assume the amphoric or metallic quality. When there is much liquid in the stomach, succussion may give rise to a sound of fluctuation, and pressure to a sound of gurgling, which may not only be heard through the stethoscope, but be audible at a little distance from the part. In health these phenomena are only of temporary duration, terminating with absorption of the liquid, or its passage through the pylorus.

70. The sounds emitted from the *intestines* are termed *borborygmi*, and arise from the passage of the gas they

contain through insufficient spaces from one part of the tube to another. They mostly occur during the intestinal part of the digestive process, and when absent may often be induced by taking a draught of cold water into the stomach. They occur abundantly during the contractions which ensue on the operation of a purgative. On administering a large enema the liquid may be heard to pass along the whole extent of the colon.

71. The flow of blood through the *veins* and *arterial branches* within the abdomen is accompanied by no sound in health. The *aorta*, however, imparts to the ear at each pulsation a single dull sound, but this is scarcely audible, except in spare subjects, and then diminishes in intensity as the aorta is followed downwards, disappearing opposite its division into the iliac arteries. It is rarely that a second sound is heard.

Physical Signs derived from Auscultation in Disease.

72. These consist in modifications of clearness, extent, and character of the several sounds which are naturally audible in the abdomen; and in the appearance of additional new sounds. Besides these, auscultation applied to the chest indicates the effect which abdominal disease has upon the physical state and efficiency of the thoracic organs.

73. The sounds described as occurring *in the stomach* may be altered in their *quality* as well as in *locality* and *extent*. In quality, they may assume a more or less amphoric character, sometimes with a distinct metallic tinkling echo. This occurs when the organ is the seat of great flatulent distension, and in these cases the heart's sounds are heard over the stomach with the same accompaniment. The stomach-sounds may sometimes be heard in localities very distant from the natural seat of the organ, and in some cases even at the lowest part of the abdomen. When the *churning* or *fluctuation sound on succussion*, or the *gurgling on pressure* persist, they indicate either that the liquid

is not absorbed, or does not pass readily through the pyloric orifice from the stomach.

74. *In the intestines.*—The gaseous sounds, *borborygmi,* may be increased or lessened in frequency or loudness; they may be especially evidenced in some part of the abdomen, or they may be inaudible altogether. Their diminution indicates a lessened activity in the intestinal contractions, while their loudness and frequency point to augmented irritability of the portion of the canal in which they occur. Their entire absence may be due to the intervention of a non-conducting medium between the intestine and the ear. Their absence over a tumour, with the exception of a line crossing some part of its surface, throws light in some cases upon the seat or nature of the palpable mass. When the colon is obstructed, the liquid of an enema is only heard to pass as far as the seat of obstruction.

The following new sounds are developed in disease:—

75. *Friction sound.*—When the surface of the peritoneum is roughened, the friction obviated by its healthy condition takes place, and, under favourable circumstances, not only affords a palpable sign of disease, but sound arises also in connexion with it. The circumstances under which it may occur are the same as those described under the palpable sign (38). All roughenings of the surface do not appear to be accompanied by it, a certain amount of pressure and resistance being necessary for its production. Friction sound may be audible also in cases where friction vibration cannot be felt. Its character presents every variation, from "gentle rustling" to loud "leather creaking" and roughness. As with the palpable sign, it should be sought for frequently, and in various positions of the trunk.

76. *Crepitation,* or *grating,* has occasionally been heard. It has arisen at one time from an accumulation of hard substances in the course of the intestine; at another it is said to have arisen from the friction of similar solid bodies, calculi, within the gall-bladder. It has also been considered possible that an

accumulation of calculi in the pelvis of the kidney might give rise to similar phenomena, but experience has failed to confirm the suggestion. Crepitation is most commonly developed by pressure, when gas has been effused into the meshes of the cellular tissue of the abdominal parietes: and it may also occur in connexion with the passage of gas by pressure through an intestinal perforation.

77. *A spontaneous fluctuation sound* may sometimes be audible, and whenever it occurs it points to an accumulation of liquid, which is put in motion, within a sufficiently wide portion of the bowel, by a powerful action of the intestinal wall.

78. *Cavernous respiration, cough, voice sound, and gurgling,* may occasionally be heard below the situation of the diaphragm, and are always connected with the presence of a cavity containing gas and more or less liquid, and communicating either with the lung, or with some hollow organ of the abdomen, from which gas can pass into the cavity. Cavernous respiration, voice and cough sounds, are only observed when there is a communication with the lung; but gurgling and metallic tinkling may not only occur under these circumstances, but also on cough or pressure, when the air has access to the morbid cavity from other sources.

Gurgling is sometimes heard over the course of the intestines where fluid and gas come into contact, and the latter is made to pass through the former in bubbles, either by the spontaneous action of the intestines, or by pressure. Its occurrence on pressure over the cæcum in typhoid fever is familiar to all.

79. It has been said that in cases of *tænia* a sound has been heard which has been compared to the sound of very fine undulations, to the distant rolling of a wheel, or to that of a small body moving in a liquid. It is too delicate in its character to be confounded with borborygmi, or any other sound than the muscular.

80. *The hydatic sound* corresponds in its characters with the

sensation afforded to the fingers on percussion (66). Like the palpable sign, the conditions of its appearance are such that its clinical value is much diminished: it may be found in any situation in the abdomen where hydatids accumulate.

The following physical signs are connected with the circulating system:—

81. *Increased intensity of the impulsive sound of the aorta* synchronous with the systole of the heart. In some cases a *diastolic shock* may also be perceived.

82. *Arterial murmur* may be sought either by application of the stethoscope over the course of the aorta in front, or posteriorly by the side of the spine. Where tumour is felt (34), it may exist over it, and should be traced upwards or downwards from it in the course of the vessel. When the murmur accompanies the tumour, although the latter is made to alter its position, it originates within the tumour itself; but when the murmur ceases to be heard under these circumstances, it must be regarded as due to compression exerted by the tumour upon a large vessel. A tumour giving rise to murmur may be situate behind the vessel as well as in front of it. It should be noticed whether the murmur is deep-seated or superficial, whether it is *heard only in front of the tumour, or at the sides* of it also, whether it follows only a certain line upon its surface, and whether it is *influenced at all by pressure of the stethoscope.* A murmur is mostly single, accompanying the systole of the heart, but it may be synchronous with its diastole, or with both. In character and intensity it may vary between simple soft blowing and every grade of roughness and grating. Whenever it occurs it indicates an obstruction of some kind to the free flow of the blood; this may be disease of the coats of the vessel, or it may be the partial compression of it by a tumid organ or some morbid growth in its neighbourhood. In all cases the murmur will be more easily produced, the more spanæmic the condition of the patient. In such patients moderate pressure of the stethoscope will produce and exemplify it. A murmur may be

audible when the patient is recumbent, but inaudible when erect. An arterial murmur, or one allied to it in many of its characters, occurs as a sign of pregnancy, and as such will be alluded to hereafter. Under certain circumstances, where a communication has occurred between the aorta and vena cava, a loud roaring *continuous murmur* occurs, which may be perceptible not only at a distance from the patient, but also by the patient himself.

83. *Venous murmur* may be heard in the abdomen in certain cases where the blood is spanæmic, or when, in addition, some pressure is being exerted on a vein. In the former case it is heard in other situations also, as in the jugulars; in the latter it is localised. It is always continuous, varying, however, in its special similitude, but soft in its tendency, and often humming as it occurs in the abdomen. When the vein in which it occurs is near the diaphragm, it is increased in intensity at each beat of the heart, and with each inspiration. A murmur of this character is sometimes heard over an enlarged spleen.

Signs having reference to the position of the Diaphragm and to the Thoracic Organs.

84. The *lower limits of natural breath sound may be raised* considerably in cases where abdominal enlargements elevate the diaphragm, and compress the lung toward the upper region of the thorax. Where abdominal retraction arises from an empty state of the hollow viscera, the lowered position of the diaphragm is indicated by the natural breath sound being heard to an unusual extent downwards. In cases where disease interferes with the expansion of the thoracic cavity, on one or both sides, the *respiratory murmur is weakened.* The same thing, and even *suppression* of murmur over a certain space, may occur from the effusion into the pleura or lung of morbid products from the abdomen. *Exaggerated respiratory murmur* may occur on one side as compensatory for defective respiration upon the other, or may, in certain diseases, which interfere with the

diaphragmatic respiration, appear only over the upper regions of the chest. In some of these cases *harshness* may be conjoined. *Tubular breath sound* may occur from compression of the lung by such abdominal disease as elevates the diaphragm; it may be observed on one or both sides, and is generally most distinguishable on examination of the back in the neighbourhood of the larger tubes. The *seat* of the heart's sounds may be altered by being raised above the natural level in some cases of abdominal enlargement. They are occasionally heard more to the right than usual. They may be heard lower than usual where abdominal retraction is accompanied by depression of the diaphragm.

85. The *rhonchi* which arise in connexion with abdominal disease, are the following:—A variety of crepitation described by Dr. Walshe* as the "*hepatic compression rhonchus*," which he believes to arise from the expansion or uncreasing of a compressed and creased portion of the lung. It only occurs in forced inspiration, not commencing till the respiratory murmur is almost at an end; it is very slowly evolved, and consists of a great number of excessively fine, dry, rather superficial crepiti, which are audible at or near the upper edge of the liver. 2. *Mucous* rhonchus may occur in connection with the effusion of liquid products of disease from the abdomen into the air tubes. 3. The existence of *cavernous* rhonchus would indicate primary or consecutive destructive disease of the tissue of the lung itself.

* Lancet, 1849, vol. i., p. 525

PART II.

PHYSICAL SIGNS OF THE DISEASES OF THE ABDOMEN.

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DISEASES OF THE LIVER AND BILIARY APPARATUS.

86. The greater number of those diseases of the liver which are accompanied by such alterations in the anatomical characters of the organ as are cognisable by the senses during life, present *enlargement* as one of their most marked peculiarities. Whatever be the cause of the increase in bulk, to ascertain its existence is an object of special investigation with the physician.

Signs of enlarged Liver.

On *submitting* to *inspection* a patient whose liver is increased in bulk, there is noticed a general fulness and augmented bulging of that part of the trunk which corresponds with its position. This of course will vary in degree, like every sign of enlargement, with the amount of increase in the size of the organ. In its slighter degrees the only indication inspection affords may be a little more fulness beneath the margin of the ribs on the right side than on the left, but this comparison may be rendered impracticable by a distended state of the stomach. In the higher degrees of enlargement the increased prominence affects the whole of the hepatic bulge, which rises more or less above its normal level; the lower ribs are pushed outwards, the yielding being most remarkable over the cartilages, which may become everted, and the prominence may extend over the right side as low as to the pelvis, or occupy all the upper part of the abdomen. In these cases, however, the fulness of the abdomen often assumes more of a general character, from the displacement of the hollow viscera filled with gas towards the left side. Where the intestinal canal is empty, and the patient emaciated, the eye can often trace the situation of the free margin of the organ: this is especially observable after the operation of tapping. The right costal angle is rendered more obtuse, sometimes to a less degree the left also, and the point of the ensiform cartilage may project forwards. The distance between the lower extremity of the sternum and the navel is in some cases increased, and the umbilical depression may be less deep than natural. When the liver is very greatly enlarged, there may be moderate venous enlargements on the exterior of the abdomen. For the most part, enlargement of the liver produces no effect upon the appearance of the intercostal spaces; but sometimes they become more prominent, being raised to the level of the ribs.

87. On making circular *measurement* of the trunk, the girth is found to be greater than natural over those parts which correspond to the enlarged organ, the right side exceeding the left beyond the usual proportion. Where, as frequently happens, the spleen is simultaneously enlarged, this difference is less evident, especially in the lower measurements. In great enlargement the descent of the diaphragm on the right side is impeded, and there is consequently defective abdominal respiratory movement of the right side of the abdomen, of the lower, and in some cases also of the upper ribs: the lower end of the sternum advances less than customary during the inspiratory acts. In connexion with these defective movements of the right side, those upon the left are exaggerated.

88. The only *palpable* sign of enlarged liver sometimes discoverable is a greater resistance to the hand on pressing beneath the margin of the ribs on the right side than on the left. The fulness and enlargement of the side and abdomen, visible to inspection, may be felt on sliding the hand over the

surface, and when this is practised from below upwards, the edge of the hand may slip into the sulcus which marks the upper superficial boundary of the organ. Below the margin of the ribs, and at the epigastrium, there is scarcely a limit to be placed upon the extent downwards to which the resistance on palpation may proceed, as it may occupy nearly the whole surface of the soft parietes. In some cases, assistance is afforded to palpation by making counter pressure with the left hand applied over the situation of the organ posteriorly. Sometimes the margin of the liver can be very readily traced, especially after tapping or parturition, but in other cases much difficulty is experienced. The best mode of feeling it, after a full evacuation of the colon, is to lay the hand flat upon the surface below its supposed situation, and, after pressing rather deeply, to slide it upwards so as to bring the radial side of the index finger in contact with it. The left margin of the liver may be felt by adopting a similar manœuvre. The resistance, whatever its abdominal extent, is observed to be continuous to the margin of the ribs on the right side. When the interlobular notch can be felt, its direction is perceived to be normal, although its depth is often greatly increased. The epigastric prominence sometimes pulsates by conduction from the aorta. The tumour from enlarged liver has little mobility. The situation of the heart's impulse may be raised by enlargement of either lobe of the liver; and the encroachment made upon the thorax is also indicated by the lessened extent downwards, to which the vocal vibration is felt.

89. The hepatic dulness on *percussion*, with lessened elasticity, is noticed to extend below the margin of the ribs, and over all that part of the abdomen which is rendered resistant to the touch; it may encroach also more or less upon the pulmonary resonance, even when it cannot be traced lower than natural, and may extend more than usually to the left of the median line. Posteriorly it may occupy the entire of the lumbar region. The dulness is uninterrupted by any resonance, except

in very rare instances, and is traceable into the right hypochondriac region. Thickening of the margin of the liver is indicated by the dulness passing into the resonance of the intestines more abruptly than in health. However low the enlarged liver may extend into the abdomen a resonant part of the surface remains above the pelvis. In cases of considerable enlargement, the dulness of the liver does not descend so much as it ought to do during the acts of inspiration.

90. *Auscultation* is only significant of hepatic enlargement in so far as it indicates an encroachment on the organs in its neighbourhood. The sounds of the stomach and intestines may thus be displaced: the breath and voice sounds over the lower part of the right side of the chest become inaudible so far as the liver extends upwards in contact with the parietes: posteriorly at the lower part of the chest the "hepatic compression rhonchus" may be observed (85); and where the lung is much compressed, the breath and voice sound become tubular, especially in the interscapular region. At the same time exaggerated respiratory murmur may be perceived over the left side of the chest.

91. *Chest diseases simulate hepatic enlargement,* by detruding the liver more or less completely beyond the cover of the lower ribs, occupying its situation in respect to the surface, either with enlarged organs or the products of morbid action. The more important of these are, emphysema of the lungs, pleurisy with effusion, and pneumothorax. *Pleuritic effusion,* on the right side, with depression of the liver, agrees with hepatic enlargement in producing bulging of the side, with deficient movement on inspiration; in abolishing the vocal vibration; in producing a palpable hepatic tumour in the abdomen, and dulness on percussion over it, extending to the right hypochondrium; and lastly, absence of breath and voice sound over the lower regions of the chest. The points of distinction between them, however, are sufficiently obvious: in pleuritic effusion, the lower ribs are less protruded, and the cartilaginous margin of

the thorax less everted, than in great enlargement of the liver; the intercostal spaces are more commonly protruded, and their width increased; and the detrusion of the heart is to the left, and not upwards as in hepatic enlargement. The direction of the interlobular notch, also, is a ground of diagnosis: in enlargement of the liver it maintains its natural perpendicular direction; but where detrusion of the liver into the abdomen has occurred, the right lobe assumes a position below the left, and the direction of the fissure is rendered oblique. It may be added, that in pleuritic effusion there is no alteration in the thickness of the edge of the liver to be ascertained by palpation or percussion, and the proportional distance between the navel and the bottom of the sternum is not increased. The diagnosis from pneumothorax and hydro-pneumothorax will be grounded on similar indications; both must be to a great extent before the liver would form a palpable tumour in the abdomen, or the chest be bulged enough to give rise to the probability of an error in diagnosis. In addition, therefore, to the lateral detrusion of the heart and mediastinum, *pneumothorax* is distinguished at once by the tympanitic character of the thoracic resonance, and its encroachment upon the upper limit of the hepatic dulness. In *hydro-pneumothorax*, however, there may be more liability to error, from the fact of the hepatic dulness being continued upwards by that of the effusion, which at a certain level is succeeded by resonance. This might be mistaken for the line at which the liver ceases, and the lungs commence, to be in contact with the wall; but it is distinguished by the resonance of the upper part of the chest being more tympanitic than it ever is in hepatic enlargement, and by the line at which it is replaced by dulness being capable of variation by altering the position of the patient. The special signs of the affection, amphoric respiration, metallic tinkling, and fluctuation on succussion, readily confirm the diagnosis. In *emphysema*, also, the detrusion of the heart, if the disease is confined to the right side alone, is to the left; and if on both sides, the dulness of the organ is neither discoverable at or above its natural seat, but, together with the impulse, is lowered towards the epigastrium. The bulging of the right side, and the abolition of tussive and vocal vibration, are distinguished from those produced by hepatic enlargement by the resonance and elasticity on percussion encroaching on the upper limit of the hepatic dulness, while the respiratory murmur is audible over the same surface. When the emphysema affects both lungs, and there is impulse at the epigastrium, there will not be found, on measurement, the increase in the proportional girth of the right side of the chest which hepatic enlargement presents. It must, however, be kept in mind, while guarding ourselves against mistaking detrusion of the liver with chest disease for enlargement of the organ, that the two states may co-exist, and that an enlarged and diseased as well as a small and healthy liver may be depressed by thoracic disease. After these general observations, which may be taken as applicable to all the diseases of the liver which are accompanied by enlargement, I shall pass on to describe the phenomena which physical examination discovers, as more or less peculiar to each special form.

Congestion of the Liver, and Hepatitis.

92. The physical signs of simple *congestion* of the liver are those of *enlargement* (86 *et seq.*) in a degree commensurate with its amount. The liver may thus appear to have undergone very little increase in bulk, or, on the other hand, it may be greatly enlarged, especially in cases of cardiac disease, where it is often conjoined with some textural alteration and hypertrophy (95): it may in the latter case reach as low as the level of the spine of the ilium. In the pure form of congestion it is rarely that *palpation* can discover the margin of the organ so as to ascertain its characters, partly on account of the fulness of the colon with gas and accumulated fæcal matter, and partly because there is no laxity of the abdominal wall, while the tenderness may in some cases occasion an involuntary muscular resistance to the pressure of the

hand. All that palpation can mostly discover is, deficient yielding to pressure beneath the margin of the ribs on the right side, when compared with the left, to the extent of a few fingers' breadth. Where the edge of the liver can be felt, and the character of the surface of the enlarged organ ascertained, the former will be perceived to be even and only slightly thickened, and the latter to be smooth. *Percussion* is more useful in determining the dimensions of the organ. The increase of dulness is generally in all directions; but it may be perceived to occur principally in the downward direction; or it may chiefly occur upwards, so as to encroach upon the pulmonary resonance, while but little is perceived below the margin of the ribs. The dulness does not shade off into the resonance of the intestines quite so perfectly as it does in health. An important and interesting character in enlargement from congestion lies in the rapidity with which its indications sometimes subside within the course of a few hours, after a full blood-letting has been practised from the arm, or the portal system has been depleted by cupping over the liver, or the application of leeches to the verge of the anus. There is often pain enough in congestion to render the *abdominal inspiratory movement* defective over the right side.

93. *Inflammation of the liver*, prior to the formation of abscess, presents the same signs, on physical examination, as congestion; the enlargement is sometimes to a very trifling extent, and in cases of very circumscribed hepatitis, there may be no signs of enlargement of the organ at all. The existence of hepatitis about to pass into suppuration has been stated on good authority to be indicated very commonly by a resistance to the hand over the right rectus muscle, occasioned by its quick and involuntary contraction; and it is said that this occurs even in impending abscess of the centre of the organ, where there is but little indication of general enlargement to guide the practitioner in his diagnosis. When the left lobe is simultaneously affected, the same resistance may occur over the left rectus; and the limitation of an abscess to the left lobe may be pointed

out by the left rectus alone presenting the phenomenon alluded to. Were this constantly the case, and incapable of arising from other morbid conditions of subjacent parts, it might prove of infinite diagnostic value. Further inquiry, however, has brought to light the fact, that although it is a frequent sign of suppurative hepatitis, yet it is not always confined to the right or to the left rectus muscle, but may occur over all the abdominal surface; and, moreover, that not only may it be absent in the form of disease under consideration,* but it may, in its limited as well as in its general form, be noticed in such very different affections as cancer of the stomach, inflamed gall-bladder, colonic disease, or peritonitis.

94. *Abscess of the liver* is sometimes unmarked by any distinctive signs, and in very numerous cases has its existence been unsuspected, or at all events unascertained, until revealed by examination after death. This occurs especially when the abscesses are small and numerous, and when the suppuration occurs in the centre of the organ, or towards its inferior surface. In other cases, however, the physical signs of the abscess are clear. *Inspection* may then display, in addition to the general fulness arising from hepatic enlargement, a new and special fulness, bulging, or "pointing," in one or more situations corresponding with the position of the liver, beneath the margin of the ribs, in the epigastrium, in the lumbar region, or in the lower intercostal spaces. When the abscess is confined to the left lobe, the fulness may only be perceived to the left of the median line, while no general expansion of the right hypochondriac region is to be remarked. It has been stated that sometimes, as abscess forms, and its signs become evident, those which indicate a general increase in the bulk of the liver (86 *et seq.*) lessen. This, however, is by no means commonly observed; for not only, in general, do we find the enlargement of the organ on the increase with the progress of suppuration, but the emaciation to which the latter gives rise renders still more obvious to inspection the

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* Parkes: On the Dysentery and Hepatitis of India, p. 114.

abnormal fulness of the upper regions of the abdomen. In some cases, where there is great general hepatic enlargement, the superficial veins of the abdomen may appear somewhat enlarged.

Before pointing occurs, however, *palpable* circumscribed tumour commonly becomes evident, occupying a larger or smaller space beneath the margin of the ribs, or in the epigastrium. When confined to the left lobe, it may extend into the left hypochondrium. There is often much difficulty, from the muscular resistance and thickened condition of the tissues, in ascertaining its character, its nature being then arrived at by a consideration of the concomitant symptoms, and the time which it has consumed in its development. As it advances towards the surface it commonly presents a softened or boggy feel in the centre, which may pass on to decided fluctuation, while the base and circumference remain hard. When adhesion has occurred between the abscess and the parietes preparatory to its spontaneous discharge on the surface, œdema and redness of the latter over the seat of tumour are conjoined. The tumour does not alter with changes in the position of the patient; but, when not adherent, may descend somewhat during the inspiratory acts. In some cases of abscess extending several inches below the margin of the ribs, there has been observed no hardness or palpable tumour whatever, but the wall has yielded readily and naturally to the pressure of the hand, the abscess being "a complete yielding bag of pus." * Where the abscesses are very numerous, and none of them of large size, fluctuation may be entirely wanting. Sometimes an abscess of the liver occupies a great part of the abdominal cavity.

Wherever it extends, it produces dulness on *percussion* over the corresponding part of the abdominal wall, whether this be upwards towards the chest, or downwards into the abdomen: in the former case it may encroach upon the pulmonary resonance as high as to the third rib or second intercostal space. When abscess occurs in the left lobe, it may point towards the cavity of the pericardium, and the dulness on percussion is then undistinguishable from that of the heart. The elevation of the heart's apex, and its removal slightly to the left, will enable the observer to recognise this occurrence.

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* Parkes, Op. cit. p. 179.

95. Abscess of the liver may not only evacuate itself on the surface of the abdomen, but *may burst*, either into the cavity of the peritoneum or into the other neighbouring serous sacs or hollow organs. Wherever it opens, its discharge is accompanied by subsidence of tumour, and by the development often of new signs, according to the part which is made to receive the contents of the abscess. It frequently occurs into the lung, either the right or left, most commonly the former, more rarely into the pleura, and still less commonly into the pericardium. When the pus enters the lung, it passes through the bronchial tubes and is expectorated; when it opens into the stomach it may be vomited; and when into the colon, it passes along its course, and is evacuated by the rectum. In any case, its appearance with subsidence of the tumour indicates the accident which has taken place. Other signs, however, occur, which it will be necessary to notice. When the pus has escaped *into the pleura or pericardium*, it gives rise to the ordinary signs of fluid in those cavities, the history of the case distinguishing the collection from the results of inflammation of those sacs. When it has passed *into the bronchiæ*, it may either be expectorated as it escapes into them, or, as in a case recorded by Dr. Stokes,* a

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* Cyclopædia of Practical Medicine, vol. iii., p. 52. The following were the signs observed in a similar case by Dr. Parkes (Op. cit., p. 93), in which the abscess burst into the right lung: "No enlargement of side; ribs rise equally on both sides; dulness on percussion from on a level slightly above nipple to below the false ribs on the right side and in the epigastrium; about two inches below false ribs, on both sides, the sound became tympanitic; percussion of right lung above nipple gave a clear, almost a bottle sound; sternum clear; left side normal.

series of physical signs may occur from the accumulation of the pus in the air-tubes of the lower lobe of the lung. These may consist in the sudden occurrence of dulness, with absence of breath sound over the lower region of the chest, without any dilatation of the side, lateral detrusion of the heart, bronchial respiration, or bronchophony, gradually giving place to mucous rhonchus, commencing at the root and extending over the dull portion, and a restoration of the natural respiratory murmur and vocal resonance. When the cavity of the abscess contains air from the lungs, as well as its own secreted fluid, cavernous breath and voice sound may be heard over its seat, together with gurgling; and the percussion sound, the voice, breathing, or cough, may present the amphoric character and metallic tinkling. When the cavity becomes filled with gas from the stomach or intestines, the dulness is replaced by resonance, and amphoric phenomena, and gurgling, with metallic tinkling, may be developed by percussion, deep breathing, and cough, or on causing the gas, by pressure, to pass through the aperture into the sac. It sometimes happens that the cavity of an abscess opens both upon the surface and into the lungs; in this case, on coughing, air has been observed to pass out by the external opening, and to be sucked in with a whistling sound during the inspiratory acts.

Respiration: on right side puerile, and tubular under clavicle, in axilla, and in mammary region; also an indistinct and somewhat minute crepitation, with expiratory murmur; at mamma, or a little above this, the loud respiration was suddenly arrested; at first it appeared as if the respiratory murmur were abolished; however, after listening for a moment or two, a sound could be heard as if air were passing along a distant tube; there was also an occasional sibilus. Lower down a large mucous râle was indistinctly heard almost to margin of ribs; in fact, heard over the hepatic region. It was certainly not like cavernous respiration, although the voice was very resonant; indeed there was imperfect pectoriloquy; no metallic tinkling; on left side respiration very audible, almost puerile; some rhonchus and sibilus here and there, and also over sternum."

Chronic enlargement and hypertrophy.

96. Under the above term I include all those chronic enlargements which occur, with more or less induration, in scrofulous children, in persons exposed for a long time to malarious influences, or in those who labour under chronic cardiac disease. It is common for ascites to stand in the way of the physical determination of the state of the liver in these forms of enlargement; but even this does not always destroy the indications of hepatic enlargement derived from inspection and measurement. The downward extent of the enlarged organ may sometimes be discovered by palpation suddenly made through the intervening liquid; but more readily after tapping has been performed. It may be felt descending to the pelvis, and simulating ovarian disease. When the edge can be felt it is perceived to be thickened and hard; it may be irregular, and the surface of the organ is often less smooth than in the natural state. Where the surface of the enlarged liver has been tuberculated, a thrill with the pulsation of the heart has been perceived by the hand applied over the cardiac region. The percussion of the liver is accompanied by a high sense of resistance. The distance from the sternum to the navel is commonly increased, and enlarged veins may appear upon the exterior of the abdomen.

Fatty Liver.

97. The circumstances under which fatty liver occurs are more distinctive of the nature of the enlargement than are the peculiarities of its physical signs. Its more frequent occurrence in females, together with the abuse of stays, to which they are commonly addicted, render nugatory in many cases the signs derived from inspection and measurement. Its dulness has appeared to me less apt to rise high into the chest than that of the other forms of enlargement, and thus to encroach less

upon the pulmonic resonance on percussion. It presents no remarkable hardness on palpation, and its surface is always smooth. In an advanced stage, the edge, if capable of being felt, is perceived to be swollen, but not irregular. On percussion, it is often found extending remarkably to the left of the median line, and the resistance is less than in other forms of chronic enlargement.

Cancer of the Liver.

98. In this disease not only are the signs of hepatic enlargement observable, but they present peculiarities which in a remarkable manner distinguish this form of new development. Sometimes, however, especially in its early stages, when the cancerous masses are few and small, there is neither general enlargement, nor any other physical evidence of the presence of the disease. The physical signs also are modified by the part of the organ affected, the form of the cancer, and the mode in which it grows. The protrusion of the cartilages of the ribs is often very partial, the rest of the hypochondrium being natural. The ordinary effect of cancer is to produce tumours in the organ, which project more or less from its surface, and both affect the form of the exterior of the abdominal wall, and become perceptible by the touch, and by percussion. They are commonly first noticed in the right lobe, beneath the margin of the ribs, or in the epigastrium. Sometimes, although the liver may be abundantly filled with cancerous matter, no great amount of general enlargement may be found, or the surface may be as even as in other forms of enlargement, no elevations at all being evident upon it. The edge of the liver is often greatly rounded; but sometimes, though irregular, it may be thin. The tumours are superficial, sometimes solitary, but more commonly numerous; when large, and coalescing, they give the idea of a bulky mass divided by sulci into large lobulations. They either form prominences upon the felt surface

of the liver, which maintains its natural form more or less, or the latter may be completely lost, and the mass of tumour alone be recognised passing up towards the right margin of the thorax, and connected with the organ which lies in that situation; while below, the fingers may often be insinuated beneath it. The tumours from encephaloid cancer are mostly of a larger size, and more rapid growth, than those arising from scirrhus; and so rare is colloid of the interior of the liver, that nothing can be said of its physical signs. Encephaloid tumours sometimes reach to the pelvis, and may, even when situated in the right lobe, be felt extending beneath the soft parietes of the abdomen far into the left side. They often extend downwards more than in other directions, the whole organ being depressed into the abdomen by their weight. When small, the surface of cancerous tumours may be felt to be cupped more or less in the centre; and, when large, a variety of irregular elevations and depressions may be perceived over their surface. Tumours, at one time separate, may, after the lapse of a few weeks, be found to have coalesced. The hardness of the cancerous tumour varies: scirrhus is decidedly hard; encephaloid, however, may have a softer feel, being more or less elastic, or exhibiting something like obscure fluctuation. When softening of a cancerous mass occurs, the elevations felt may disappear, become hollowed out, and supplanted by a depression. Cancer affecting the lower surface of the organ at the entrance of the portal vessels is commonly complicated with ascites, and then it is often only after tapping that the enlarged organ, with its annexed tumours, can be felt. The weight of the liver, as ascertained by movement of it by the hands (if this can be effected), is observed to be greatly increased. When the left lobe alone is affected, the tumour may be confined to the left of the median line, and fulness, or prominence may be visible in the left hypochondrium. It sometimes pulsates also; but this phenomenon disappears on placing the patient upon the hands and knees.

99. On *percussion*, dulness with resistance is observed over

the mass of enlarged liver, and over the tumour; the one being continuous without interruption into the other. The outline of superficial dulness, both above by the side of the thorax, and below, may be uneven. The dulness may not rise high into the chest in cases even of great enlargement, where the tumours occupy a large portion of the abdomen. In cancer of the left lobe the dulness may rise as high as the second or third rib on that side. The continuity of the dulness is not a constant characteristic, as I have met with a resonance on percussion between a dull tumour towards the centre of the abdomen and the seat of continuous dulness of the liver. This has been due to the colon crossing the surface of a lobulated encephaloid mass, and lying in a groove. The diagnosis of the nature of the tumour below the resonance, however, could in such a case be assisted by observing that, on pressure over the resonance, a dull sound could be elicited, and a solid part beneath be felt continuous between the tumour below and that above it, and by the resonance having a direction more or less horizontal.

100. Even where the cancerous deposition is extensive, the *measurement* of the two sides may be equal; but commonly this mode of examination indicates, as in other forms of enlargement, increase of the circumference of the right side. The relative girth of the different levels of the trunk, however, are often remarkably modified according to the locality of the greater mass of disease. As the increase in encephaloid occurs mostly towards the abdomen, the lower measurements, near the umbilicus, are proportionally larger than the lower thoracic; and often the proportional distance between the sternum and navel is greatly increased. I have met with it as great as 10¼, while that between the navel and pubes was 4½ inches. The superficial veins are commonly enlarged.

According as cancer of the liver encroaches upon *the chest*, it produces, of course, all the signs enumerated of enlargement in this direction. When it is the left lobe alone which is the seat of disease, the heart has been observed to present the ordinary indications of displacement to the right; while respiratory murmur has been abolished over the left front, as high as dulness extended; and posteriorly, dulness on percussion, with tubular breathing and bronchophony, have been observed. This series of phenomena might be confounded with the effects of pleurisy and pneumonia. The former might give dulness, and displace the heart, but would, in addition, greatly expand the left side of the lower part of the chest, and protrude the intercostal spaces, while it would not produce a tumour beneath the margin of the ribs: pneumonia, again, would not displace the heart, or produce tumour beneath the ribs.

Hydatid Disease of the Liver.

101. When a hydatid cyst forms and attains any size in the liver it commonly produces visible elevation of the surface over its seat. Tumour connected with the liver is also evident on *palpation.* Its ordinary seat is at or near the epigastrium, or it protrudes from under the margin of the ribs on the right side. No general increase in size of the liver may be ascertainable by any of the means of exploration, but sometimes this is conjoined. The tumour is commonly solitary, but there may be more than one perceived, and where both lobes are attacked, the largest tumour is noticeable over the situation of the right. The outline of the liver, even when enlarged, may be perfect. Where the tumour passes from under the edge of the organ, it may appear fixed posteriorly, and simulate an enlarged kidney. The fact of the tumour occupying the right side of the abdomen is no evidence of its origin in the right lobe, as a cyst arising in the left may extend in this direction, and even descend into the right iliac fossa. The size of the tumour varies; it may be very large, occupying a great part of the right side of the abdomen, or even the greater part of the cavity; it may appear to vary with the state of distension of the stomach, especially when seated in the left lobe. Its shape is

mostly globular, and its surface even and smooth, but occasionally it is more or less lobulated, and its exterior feels unequal. It never grows so rapidly as some other hepatic tumours, and is often of very slow growth, and very chronic duration. It may be hard to the touch, and in this way not distinguishable from a solid tumour, but often it presents a high degree of elasticity; and this, when present, is a very characteristic sign. The hardness may vary in different parts of the tumour. It sometimes fluctuates; but even when fluctuation is noticeable it is not less obscure than that of encephaloid cancer, and the thickness of the capsule will influence its perfection. Hydatid tumour of the liver is, like other forms of enlargement, sometimes obscured by ascites. Like cancer, it sometimes transmits pulsations from the aorta, which may be distinguished from those of aneurism by their cessation on placing the patient on the hands and knees, so as to favour gravitation from the vessel.

On *percussion*, a hydatid tumour is dull; the dulness is continuous with that of the liver, and is bounded, like the liver dulness, by the resonance of the stomach and colon. Like other forms of enlarged liver, its dulness may rise up into the chest. When the proper proportion exists between the hydatid vesicles and the intermediate liquid, the hydatic fremitus is perceived during the percussion, or heard on practising auscultation. When the hydatids are situated far from the surface of the abdomen, this sign is in a corresponding degree obscured. When the disease is extensive it obstructs the diaphragmatic movements, and the superficial veins of the abdomen may be increased in size.

102. Hydatid cysts of the liver sometimes become inflamed and suppurate, and the abscess thus formed may present the same signs as if it arose in any other manner. They sometimes open, and discharge their contents into the peritoneum and pleura, the lung, alimentary canal, or upon the surface of the abdomen. When this occurs, subsidence of the tumour is noticed, coinciden perhaps with the evacuation of hydatids by coughing, vomitin

or stool; and all the signs of cavity may be observed as when abscess evacuates itself by the same channels. In a case where a hydatid cyst of the left lobe opened into the stomach, and a chronic communication was established between the cavities, an uniform swelling was noticed in the precordia, which was always most prominent after taking food, and lessened immediately after the act of vomiting, whether this was spontaneous or the result of an emetic. In another patient, whose case is reported by M. Guillemin,* the sac containing the hydatids had formed a communication with the intestinal canal, and the expulsion of the hydatids into it was accompanied, during a period of twenty minutes, by a true tinkling sound, similar to that produced by grains of fine sand falling into a glass cup, and audible by the naked ear at the distance of a foot from the patient.

103. In addition to hydatid cysts of the liver, *simple serous cysts* sometimes occur, either beneath or external to its peritoneal covering. They occasionally attain a very large size, and, like an enlarged liver, may come to occupy much of the cavity of the abdomen. When they form near the upper surface of the liver they may push up the diaphragm on the right side as high as the level of the second rib, and depress the rest of the liver far into the abdomen, giving rise to the idea that the organ is enlarged. The peculiar form of the right side of the thorax in these cases, and the absence of the signs of thickening and enlargement of that part of the liver which is palpable beneath the margin of the ribs, will commonly assist in the diagnosis. Great deformity and expansion of the side is produced by a large cyst developed beneath the cover of the lower ribs, raising them and so turning them on their axes that their outer surfaces become superior and their inner inferior. When a serous cyst is formed near the under surface of the organ it projects downwards into the abdomen, being dull upon percussion, but leaving a part of the abdominal surface resonant above the pubes. If the walls of a serous cyst are lax it may present more or less fluctuation.

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* Arch. Gén. de Méd., 4me Ser., t. xvi, p. 118.

In a case recorded by Abercrombie,* a cyst had formed between the convex surface of the liver and the diaphragm, in which fluctuation was observed; but it was most obvious in the erect posture, appearing to retire under the ribs when the patient was recumbent. It is sometimes as hard to the touch as a solid organ, so as to have been mistaken for enlargement of the liver. A hydatid, or serous cyst, may rupture into the peritoneum, when the signs of liquid effusion into that cavity will be presented, accompanied by a subsidence of the palpable tumour.

Cirrhosis of the Liver.

104. In the advanced stages of cirrhosis the abdomen is generally distended by ascites, and the obstruction in the venous circulation, which throws this obstacle in the way of a physical examination of the liver, mostly gives rise, also, to some enlargement of the superficial veins of the abdomen. The palpation, however, may be practised through the intervening layer of fluid, and by quick depression of the fingers in the epigastric region the presence of a solid organ may be perceived. In that form of cirrhosis in which the general bulk of the liver is lessened this may be the only spot at which the organ can be perceived at all, not being palpable beneath the margin of the ribs in the vertical line of the nipple. In some forms of atrophy, the left lobe of the liver may be almost lost, and then even at the upper part of the epigastrium no solid organ can be felt on the most diligent search. The condition of the edge and surface of the organ are most easily ascertained after tapping: they are then found to be uneven and nodulated, the edge in addition being rounded. The margin of the left lobe is perceived not extending so far to the left as customary, and, when the interlobular notch is to be felt, the horizontal dimension of that lobe can be ascertained to be much diminished.

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* Diseases of the Stomach, Obs. cl. See also Med. Chir. Trans., vol. xviii., p. 129.

In some cases the edge of the organ may be very difficult to feel from a portion of intestine slipping up between it and the wall. Where there is much ascites, of course the dulness of the liver will be so merged into that of the peritoneal effusion that but little information can be obtained by *percussion*, except that occasionally the upper line of superficial liver dulness may be found uneven. When the extent of dulness can be ascertained, however, it is found reduced in every direction. It has been asserted that, in the early stage of cirrhosis, physical examination will give evidence of general enlargement, and that as the disease progresses gradual diminution of the organ may be traced. I have not been able, however, to satisfy myself of the truth of this statement. Certainly in many cases there has been no previous enlargement, or only of the temporary character which pertains to congestion. A granular liver is not always small, even in the advanced stages of the disease, and it may even be large, as where fatty degeneration is conjoined.

Dilatation of the Gall Bladder and Ducts.

105. Dilatation of the gall bladder, when moderate in extent, and when the liver itself does not descend below the margin of the ribs, may only present, as a visible sign of its existence, a deficiency of depression beneath the margin of the right false ribs. When greatly enlarged, however, the fulness of the abdomen may, as in hepatic disease, become general, and then there may be added a special bulging of the lower ribs upon the right side, as well as a comparatively greater fulness of the whole right side of the abdomen.

It produces, also, a *palpable* superficial tumour, whose situation will vary with its size, and with the position and size of the liver. When the liver has not materially extended beyond the margin of the ribs, the tumour is perceived either as a rounded projection beneath them, or, where the edge of the liver can be felt, deviating from its even lower margin. When small, it is commonly situated somewhere above the level of the umbilicus, and almost always to the right of the median line; but where there is much enlargement of the liver from biliary accumulation or other causes, or descent of the organ in consequence of the abuse of stays, or chest disease, the gall bladder of course descends with it, and may be found forming a tumour below the navel and at the middle line. Unless care be taken in determining its relations, the nature of a tumour here, with the characters about to be noted, might be mistaken. Its size varies from being only just perceptible to one which may occupy a large part of the abdomen. It may extend from the right hypochondrium into the right lumbar or iliac region, and into the umbilical and epigastric regions on the one hand, while it may almost reach to the pelvis on the other. When not very greatly distended, the tumour may be readily defined to be pyriform in shape, the widest part downwards, and it may often be embraced between the finger and thumb. Its margin will feel evenly rounded, and its surface even, smooth, and polished. It sometimes presents a considerable amount of resistance to the fingers, but is mostly more or less elastic, and is, when large, soft and fluctuating; the readiness with which the fluctuation is felt depending on the thickness of the wall of the gall bladder, and of the tissues intervening between it and the hand. The position of the tumour does not vary with altered posture of the patient, remaining the same after he has been lying for any length of time upon his left side. Occasionally, however, though the tumour does not lessen or disappear, it may change its place a little. It has been occasionally observed to be most apparent when the patient lies upon the back, becoming less so on his assuming the erect or sitting posture.

Percussion over the dilated gall bladder elicits a dulness continuous with the superficial dulness of the liver; and on tracing the lower margin of that organ is perceived by its dulness to project beyond it. Where it lies in contact with intestine containing air, the "humoric sound" is said to be elicited; but to ascertain this the examination must be repeated at different times during the day, and with varying degrees of force. A dilated gall bladder may open by ulceration, like an abscess upon the mucous or serous surfaces of the abdomen, in which case subsidence of the tumour will occur.

106. Distended gall bladder is capable of being confounded with abscess and hydatids of the liver. It is distinguishable from abscess by its quicker formation, its circumscribed and easily defined form, and, when it fluctuates, by this sign occurring throughout its extent, and often appearing coincidently with the tumour itself. On the other hand, hepatic abscess presents induration as a character of its tumour prior to its fluctuating; the soft and fluctuating spot is mostly surrounded by induration, and there is œdema of the integuments where pointing is about to occur. It is also likely to be confounded with hydatid disease of the liver, which may produce a circumscribed tumour in the same situation; it is distinguished from this, however, by its quicker growth, its pyriform shape, and perhaps by its more perfect fluctuation. The hydatic fremitus, if present, will show the existence of the parasites; but it will not follow, even when this is ascertained, that the hydatid disease is in the liver, as the gall bladder itself may, in rare instances, contain them.

107. *Dilatation of the hepatic and common bile ducts* may produce swelling and tumour occupying the epigastric and right hypochondriac regions, sometimes extending below the umbilicus, dull upon percussion and manifesting very distinct fluctuation at the most prominent part, a little below the ensiform cartilage, and a little to the right of the median line.

108. *Distension of the liver with the retained bile* is sometimes conjoined with dilated gall bladder and ducts; and in some of these cases its edge may be perceived extending across the abdomen from one flank to the other. The tumour it produces is even and smooth upon the surface, and fluctuation may be perceived over a great part, or the whole of it, or some spot

near the median line, and between the umbilicus and ensiform cartilage may be more prominent than the rest, and alone fluctuate. The tumour, of course, is dull upon percussion.

Inflammation of the Bile Ducts and Gall Bladder.

109. The occurrence of inflammation in the course of the *bile ducts*, and consequent closure of their canal, is only marked physically by dilatation affecting the ducts or gall bladder above the inflamed part. When the *gall bladder* is inflamed the abdominal muscles may be rendered so irritable as to contract spasmodically when the attempt is made to examine the abdomen by palpation;* but unless there be dilatation, or some accumulation within the gall bladder, no extended dulness is observable upon percussion. *Abscess* may occur within the gall bladder. The signs which were observed, in a case recorded by Dr. Coley,† were obscure tumour below the umbilicus, hard, and appearing adherent to the parietes of the abdomen and right lobe of the liver; below the umbilicus the tumour extended down about five inches, and it was four inches in width. In four days' time it had extended and become prominent, and fluctuated distinctly, especially towards the umbilicus, where a projection was observable: it burst at the navel.

Calculus of the Gall Bladder.

110. This is not indicated by any of the signs of enlargement. When the bladder reaches the wall of the abdomen, and when at the same time the calculi are numerous, and the parietes of the abdomen thin, it is possible that some calculous grating may be felt on pressure, or heard during strong expiration, on application of the stethoscope. Suppurative inflammation may occur, and both pus and calculi be discharged upon the surface, or at

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* Graves's Lectures on Clinical Medicine, 2nd edition, vol. ii., p. 259.

† Med. Gazette, N.S., vol. v., p. 1073.

the umbilicus. They may also make their way into the stomach or bowels, and be discharged by vomiting or stool. A case has been recorded by Dr. Klemm,* in which a calculus passed through the abdominal wall. The signs observed were the following:—Towards the right hypochondriac region, below the false ribs, there was a hard tumour, of the size of a goose's egg, moveable, but adherent to the external integuments of the abdomen. At the expiration of fourteen days the tumour swelled, and three days afterwards fluctuation was distinct; yet the tumour retained its shape and firmness. An incision was made into the swelling, pus was evacuated, and a gall stone extracted, which had been enclosed in a very dense cyst between the muscles of the abdominal wall. The calculus was as large as a hen's egg, and of the shape of the gall bladder.

DISEASES OF THE PANCREAS.

111. The depth at which the pancreas lies from the anterior parietes of the abdomen renders the determination of its physical condition exceedingly difficult, and often quite impossible. Enlargements, however, are sometimes to be discovered, where emaciation has proceeded to some extent, but in order to the enlarged organ being reached by the fingers, the stomach must be empty, and the bowels recently and fully evacuated. Sometimes these enlargements are best felt when the patient is placed on the hands and knees.

Inflammation of the Pancreas.

112. This may produce a palpable tumour, deeply seated and obscurely felt at the epigastrium; but commonly no evidence of this condition is afforded by physical examination. It is more likely to be observed when abscess has occurred.

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* Archives Générales, 4me Ser., t. ii., p. 97.

Cancer of the Pancreas.

113. This has been the cause of nearly all the pancreatic tumours which have been recorded. When involving the duodenum, pyloric extremity of the stomach, and meso-colon, there may be local projection of the abdominal wall, especially if there be considerable emaciation, with an empty condition of the digestive canal. More commonly, however, the tumour is only evident to the touch. It is generally situated deeply in the epigastrium, or somewhere above the umbilicus, and near the middle line of the body, but, when very large, has extended crosswise to the right or left hypochondrium, or the right or left flank. When affecting chiefly or solely the head of the pancreas, it may be discovered in the right hypochondrium alone. It may apparently vary in size, or not always, but only occasionally, be felt, according to the state of fulness of the stomach and colon. Its form may be rounded or flattened, and its inferior border may sometimes be distinctly circumscribed. Its surface may be moderately smooth, or obscurely knotty or irregular. In all cases its fixity to the posterior part of the trunk is remarkable. In most cases it is the seat of a regular pulsation synchronous with the cardiac systole, and giving to the hand the idea of a hard substance being forced up by the beating of the aorta behind it. In a case recorded by Dr. Sandwith,* the pulsation was evident below the cartilages of the left false ribs, apparently in consequence of the splenic artery being involved in the disease. An arterial bellows murmur is also commonly audible over the seat of pulsation. In a case of Dr. Fletcher's,† this was heard in the recumbent posture only, and was inaudible when the patient was placed semi-erect; the epigastric pulsation was diminished at the same time, and there was no bruit audible over the spine. The position of the stomach and colon in front of the tumour will occasion resonance over its seat. Where

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* Observations in Medicine and Surgery, by Thomas Sandwith, 1821, p. 88.

† Prov. Med. and Surg. Jour., 1844, p. 319.

cancer of the pancreas involves the tissues surrounding the vena portæ and vena cava, there may be so much ascites as entirely to obscure the evidence of even considerable enlargement.

Displacement of the Pancreas.

114. When the *head of the pancreas is displaced* downwards by the abuse of stays, and, from the same cause, the liver is elongated in the same direction, the latter may exhibit over its dulness a palpable tumour due to the head of the pancreas between it and the lumbar curve. I have known such a tumour, apparently of the liver, to pulsate forwards, and to transmit to the ear both sounds of the heart. The *tail* of the pancreas may be the displaced part, descending with a displaced spleen, so as to give the organ a vertical direction; the position of the spleen may be ascertained by palpation, and where symptoms of strangulation (156) coincide, it is well to recollect that this displacement of the pancreas may accompany it, and be the strangulating cause.* In all probability, however, it would be too much concealed by the distended intestinal convolutions to be recognised in its new position by any physical signs.

DISEASES OF THE SPLEEN.

Displacement of the Spleen.

115. Wherever the organ may lie, its *percussion* dulness will, on the most careful and repeated exploration, be found wanting over its accustomed seat. If the displacement be upwards, its dulness will be found higher up on the side of the chest, as occurs when pressure is exerted on it by gaseous or fluid accumulations in the abdomen. When displaced downwards, the spleen may be found as a palpable tumour as low even as the left iliac region; and, unless adherent in its new situation, it will be moveable, and may even alter its position somewhat with changes in the posture of the patient.

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* Archives Générales, 4me Ser. t. xvi., p. 507.

Signs of Enlarged Spleen.

116. According to the size and position of the organ, there is *visible* more or less fulness of the corresponding part of the abdominal wall, palpable also to the hand passed over the left side of the abdomen. The fulness may engage the left hypochondriac and epigastric regions, and the left lower ribs may be bulged outwards. When it is very large, the whole of the anterior abdominal wall may protrude, the prominence of the left side still visibly exceeding that of the right. The prominence of the wall may be rendered still more apparent by the gravitation of the tumour on placing the patient on the hands and knees. The superficial veins on the abdomen may appear enlarged. On *measurement*, the left side of the trunk will, according to the height of the tumour, be equal to that of the right, or may exceed it. According to the size of the organ, also, the movements of the left side of the abdomen and of the lower ribs are restrained.

117. When only enlarged to a small extent, the spleen produces no *palpable* tumour, but, as it increases, its lower extremity is to be felt on pressing upwards beneath the margin of the ribs, a little posterior to the vertical line of the nipple, as a rounded surface which is perceived to be somewhat moveable. The regular increase of the spleen in all directions, renders it practicable to infer from the portion felt the whole bulk of the organ. Where there is much more enlargement, the tumour it occasions may be perceived resisting the hand as far forwards as the median line, or beyond it, and downwards as far as the ilium, and to be placed very superficially. When very large, it may lie obliquely across the abdomen, and even be felt in the right flank and iliac fossa, as well as in the corresponding regions on the left side; the descent and altered position of the organ arising from gravitation, which is permitted by the character of its peritoneal attachments. It is also readily moveable by the

hands, and its weight may be estimated by causing it, on altering the position of the patient, to rest upon them. Its form is mostly oblong, and its surface smooth. Its anterior edge, which is commonly very easily defined, and permits of the fingers being introduced beneath it, is sharpish, and mostly feels notched and fissured: the posterior edge may sometimes be defined in the lumbar region, especially if the wall of the abdomen be thin. I have known the tumour descend quite into the pelvis, and extend upwards from it as high as to the margin of the ribs on the left side, its upper margin being palpable and irregularly lobulated. In this case it resembled an ovarian enlargement. I have, however, never known it rise as high on the right side as on the left. The resistance to the hand occurs over the whole surface of the palpable tumour, and is never crossed by a yielding portion. The consistence of an enlarged spleen varies; it commonly feels quite hard, but sometimes gives rise over its extent of resistance to a sense of fluctuation, on manipulating in the manner employed to elicit this sign in ascites. This is distinguished, however, from the fluctuation of fluid by a push given with the flat hand to the tumour on one side being perceived on the opposite as the impulsion of a solid body. According to the height to which an enlarged spleen rises into the chest, it destroys the tactile vocal vibration, and may raise the seat of impulse of the apex of the heart as high as the fourth intercostal space. A pulsation may be occasionally felt in a splenic as in a hepatic tumour, by communication from the aorta behind it.

118. Moderate enlargement can only be detected by *percussion*, which is dull over all the parts where the spleen comes in contact with the wall. When there is palpable tumour and the organ is not displaced, its dulness extends upwards to the left, to become continuous with that over the natural seat of the spleen, no intestinal resonance ever intersecting it. Sometimes the dulness rises high up upon the wall of the chest, or descends into the lumbar region.

119. A continuous venous murmur is sometimes heard over

the surface of an enlarged spleen; a common seat of it is at the right edge of the tumour, below the xiphoid cartilage. In a case in which I observed it, it was increased in loudness with each inspiration and each systole of the heart, and was accompanied by a palpable thrill. I have also met with a murmur accompanying each arterial pulse in the left iliac region, where the enlarged organ has extended so low as this. The respiratory murmur is not heard over that part of the left side of the chest upon which the spleen encroaches, while an exaggerated breath sound may become audible over the infra-clavicular and suprascapular regions.

120. It is very common for enlargement of the spleen to be coincident with enlargement of the liver; the former cannot then take a position as oblique as it might otherwise have occupied, and a non-resistent sulcus may be felt between the organs, which will allow a finger or more to lie in it, and which is resonant on percussion. I have sometimes found this sulcus absent, and the edge of the liver overlapping and obscuring the anterior edge of the spleen; in such a case the abdomen has presented a tumour reaching quite across it from one side to the other. The line of union of the two organs may be judged of by careful palpation of the lower edge, when two notches may be felt; that to the right being the interlobular notch of the liver, and the next to it, passing towards the left, being the result of the juxtaposition of the edges of the two organs. Enlargement of the left lobe of the liver may be confounded with an enlarged spleen: it may be distinguished by tracing its dulness to be continuous into the right hypochondrium, and by tracing down its lower edge, by percussion and palpation, in a curve towards the right side. When enlargement of the spleen is conjoined with enlargement of the kidney, the splenic tumour is observed to be moveable, while that constituted by the kidney is fixed.

Congestion of the Spleen.

121. The enlargement producedby congestion is often on

discoverable by percussion, but where it has been frequently repeated, and become chronic, or accompanied by *hypertrophy* of the tissue, this condition is indicated by the signs of great enlargement already enumerated. In simple congestion, rapid variation in the size of the organ, as measured by percussion, may be noticed under the operation of remedies. Where the organ has become greatly increased by congestion, palpation should be gently performed, and not repeated unnecessarily, since it sometimes becomes so soft as to burst under trifling pressure, or even sometimes spontaneously. The resistance offered by muscular contraction often renders it impossible to determine the consistence of the tumour.

Inflammation of the Spleen.

122. This may terminate in *abscess*, which is commonly unrecognised until it has burst and evacuated its contents, which it may do into any of the situations where hepatic abscess may burst. It may produce fulness of the left hypochondrium, and a sense of resistance over the epigastric region. It has been known to burrow between the layers of the abdominal parietes, and point and burst at the umbilicus.* It has also been known to produce a tumour posteriorly the size of a child's head, at the left side of the lumbar spines.† When bursting into the serous sacs, it will exhibit the same signs as would be produced by a similar amount of liquid in the same situation.‡

Cancer of the Spleen.

123. This is a rare affection, in which the enlargement is less regular than in the other forms of disease, the form of the organ being more or less altered. It may, indeed, not be materially

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* Abercrombie on Diseases of the Stomach, p. 380.

† Prov. Med. and Surg. Jour., vol. x., p. 74.

‡ An interesting case of abscess of the spleen communicating with a gangrenous cavity in the left lung is described by Dr. Law. Dublin Journal of Medical Science, N.S., vol. xi., p. 237.

enlarged at all, but when it does form a palpable tumour, its surface will be found to be uneven and nodulated, and on percussion the outline of the dulness will not represent the oval form of other simpler kinds of enlargement.

Hydatid Disease of the Spleen.

124. This cannot often be distinguished from the development of hydatids in the folds of peritoneum about the organ, especially in the gastro-splenic ligament. The irregular form of the tumour, however, distinguishes it from the ordinary enlargements, while it is distinguishable from cancer by the greater evenness of the surface, or, if the latter present elevations, by the greater similarity in their size. When present, the hydatic fremitus will be distinctive. When a hydatid tumour of the spleen bursts into the abdomen, it produces similar signs to those observed when the same accident occurs in hydatid disease of the liver.

DISEASES OF THE KIDNEY.

Displacement of the Kidney.

125. This may occur independently of disease of the texture of the organ. As in displacement of the spleen, its dulness will be wanting in its natural situation, unless enlargement of the spleen, or liver, or of the supra-renal capsule be conjoined. One form of displacement I have already alluded to (59 *a*), in which there was apparent a palpable moveable tumour on the left side, partly covered by the cartilages of the ribs. A more common displacement, however, is that towards the pelvis, and the organ may form a tumour by lying entirely in the iliac fossa; for the most part, however, it is only the lower end of the organ which can be felt there. The characteristic form of the kidney can sometimes be felt, and enables the observer readily to recognise the nature of the tumour: its position, however, is in these

cases commonly altered; the upper portion of the organ is depressed, and the hilus is felt directed upwards. Healthy kidneys, which lie low enough in the loins to be manipulated, may occasionally be so loosely connected by their surrounding cellular attachments as to be capable of being moved up and down by the observer to the extent of an inch or so along the side of the spine.

Signs of Renal Enlargement.

126. In the minor degrees of enlargement, such as occur in *congestion* and some forms of *inflammation of the kidney* (*nephritis*), no external sign is presented to the eye; but careful palpation, as directed for the discovery of the healthy organ, will, under favourable circumstances, discover the lower part of the organ, broader and more prominent, and sometimes descending to a little lower level than in health. When, however, the kidney is more enlarged, as in pyelitis, cancer, etc., it may come to occupy no small part of the entire space devoted to the abdominal organs. It then produces *visible* enlargement of the abdomen, which may present itself as a fulness, or bulging, in the seat of the affected kidney, in the flank, lumbar region, and iliac fossa, with protrusion of the lower ribs, and increase of semicircular measurement: general abdominal enlargement may be conjoined. The lumbar enlargement is best seen on comparing the two sides, as the patient sits on a chair, or leans on the hands and knees; it is, however, the last direction in which bulging occurs, on account of the greater density and resistance of the tissues which constitute the abdominal wall on this side of the kidney, and it is a locality in which it may be absent even when the kidney is greatly enlarged. When the enlargement is great, it is not uncommon to see some distension of the superficial veins of the abdomen, with some deficiency in the abdominal respiratory movement on the affected side.

127. The bulging of the abdominal wall is not only visible,

but may be felt, and its limits tolerably traced, by sliding the hand over the surface; and on pressure a *palpable* tumour becomes perceptible in the same situation. It may extend forwards as far as to the median line, or even beyond it; upwards it may become lost far under the ribs, while downwards it may enter the iliac fossa. It is traceable backwards to the spine, is fixed to the loin, is readily definable anteriorly and inferiorly, and does not present a sharp edge, but is oval or rounded in its general contour, sometimes presenting an indentation at its anterior part. The direction of its longer axis is vertical. Its consistence and the character of its surface vary with the nature of the enlargement. A yielding portion is commonly perceived at some period on the surface of the tumour, either lying vertically along it, or crossing it more or less obliquely: it is sometimes so marked as to give rise to the idea that there are two tumours in place of one. This is due to the intestine which lies in front of the kidney, and the deception is similar to that which I have noticed as of more rare occurrence in the case of the liver. A renal tumour sometimes pulsates.

128. The dulness on *percussion* extends over all the surface which is in contact with the enlarged kidney, posteriorly, laterally, and in front, where it encroaches upon the resonance of the moveable intestines. In consequence of pushing the liver and spleen upwards, the dulness may rise high upon the wall of the chest. The colon, however, which lies in front of the organ, is not pushed aside, but, according to its degree of gaseous fulness, produces a resonant note in front of the tumour.* On *auscultating* over the organ, the gaseous sound of this portion of the bowel may also be heard.

129. *Renal diseases, accompanied by enlargement*, are capable of being mistaken for diseased conditions of other organs whose physical signs have been described, the cause of which is mostly a similarity in the situation of the tumour. On the right side, the

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* Although this holds good in a large majority of cases, yet I believe i is open to exceptions.

difficulty lies in distinguishing renal tumours from *enlargements of the liver* and gall-bladder; and, on the left side, from enlargements of the spleen. The former is by far the most difficult, since the liver is little less fixed than the right kidney, and is very commonly the seat of the same form of disease; besides which, the renal tumour may be entirely obscured by an enlarged liver overlapping it. The distinction upon which the greatest reliance is to be placed, and which, in the majority of instances, will be found applicable, is the existence of the signs which palpation, percussion, and auscultation, severally afford of the presence of a portion of the colon in front of the tumour. It is rarely that this sign is present in hepatic, or absent, at one time or another, in renal tumour. Careful palpation, also, will commonly enable the observer to trace back to the spine the renal enlargement, while the fingers can be insinuated between it and the ribs, and sometimes detect the edge of the overlapping margin of the liver. Its more superficial character will also aid in distinguishing hydatid tumour of the liver from a dilated right kidney, which otherwise it greatly resembles. The capability of its being traced back to the spine by the hand, and by percussion, will also distinguish a fluctuating tumour of the kidney from that of a *distended gall bladder;* in addition to which, the very superficial position of the latter, and its smoothness and pyriform shape, are distinctive characters. From an *enlarged spleen* it is distinguished by its anterior margin being rounded, in place of being sharp and notched, by the position being vertical in place of tending to the oblique, by its fixity posteriorly in the loin, in place of a more anterior position and more or less mobility, and by the resonance of the colon anteriorly.

Pyelitis.

130. *Pyelitis, with consequent purulent distension* of the kidney, such as occurs in calculus of the organ, presents in its advanced stages the signs of large renal tumour, at first resistant, tense, and somewhat elastic, but becoming softer without losing its

ready definition; at length it fluctuates, the fluctuation being at first deep-seated and obscure, but becoming daily more and more distinct. These signs do not vary at all with the position of the patient. The enlargement once perceived steadily advances, assuming the oval form, the surface being smooth and even at first, but presenting at its full growth moderate elevations. When large, it can extend even to the iliac fossa and hypogastrium. It sometimes produces visible fulness of the loin. There is no discoloration of the surface externally. When purulent or other collections within the kidney burst into the peritoneum, they produce signs of effusion into that cavity. The *dulness* of the tumour is mostly separated from that of the liver by the resonance of the transverse colon, but in other cases their dulness is continuous, the renal tumour adhering to the liver, and pushing away the colon. The dulness may extend downwards as low as to Poupart's ligament, while the liver or spleen are so far pushed upwards that their dulness is made to encroach on the resonance of the chest.

Perinephritis.

131. Inflammation and effusion of serous or sero-purulent matter, with or without renal fistula, may occur in the tissue immediately surrounding the kidney. It produces all the physical signs of pyelitis, with which it is frequently conjoined, and from which it is not always easy to distinguish it. The fulness in the posterior lumbar region, however, is more marked than in pyelitis, especially if the tissues behind the kidney are chiefly affected, and is conjoined with œdema in that situation. Fluctuation, also, is more superficial than in that disease, and more readily detected posteriorly.

Hydronephrosis.

132. The physical condition of the organ, with the exception of the character of the distending liquid, being similar in the

two diseases, hydronephrosis produces the same physical signs as pyelitis. The tumour may attain the large size of the uterus in the last months of pregnancy, and its surface always presents marked rounded elevations. The tumour is of slower growth than that from purulent distension. The diagnosis must mostly be made upon other grounds than those arising out of the physical examination.

Cysts of the Kidney.

133. These may be *simple* or of *hydatid* origin. *Simple cystic disease* may exhibit all the signs of enlargement of the kidney. Like other tumours, it may appear divided; and even fluctuation, apparent enough in one direction, may be inappreciable in another. It may be so large as to cause protrusion both of the lower ribs and of the ensiform cartilage. It does not present the lobulated form of hydronephrosis or pyelitis. *Hydatid disease* presents most of the characters of the ordinary fluctuating tumours of the kidney (130—132); the only physical sign by which it can be distinguished from them being, under favourable circumstances, the perception of the hydatic fremitus.

Cancer of the Kidney.

134. Tumour from this cause may first appear in the right hypochondriac region; and, in its advanced stages, it commonly occupies a little higher level than that from pyelitis, although it may extend quite as low towards the pelvis. Like other renal tumours, it may appear as two distinct masses. It often appears rather as a tumour growing from the under surface of the liver (when on the right side) than as one of the kidney; in other cases it can be traced by the hand slid over the surface as passing beneath it; the margin of the liver being felt as a softer substance in front of the tumour, and overlapping it. Its surface is irregularly tuberculated; the elevations being larger than those of pyelitis or hydronephrosis, and projecting far above

the general surface of the enlarged organ. It is solid and elastic to the touch; sometimes, however, obscurely fluctuating, especially when much blood enters into its composition. It may produce fulness in the loin; and enlarged veins are more common in connection with it than with other renal tumours. The dulness on *percussion* may rise as high as the sixth rib on the left side, extending downwards from this point to the crista ilii. When it is thus large, it causes encroachment of the diaphragm upon the chest, and corresponding physical signs.

Tuberculous Disease of the Kidney.

135. This very rarely arrives at a size sufficient to form a renal tumour. According to Rayer, the hardness of a tuberculous kidney distinguishes it from pyelitis. When it softens, however, a fusiform abscess may be formed extending towards the crural arch, difficult to distinguish from a purulent collection in the pelvis and vicinity of the kidney, and also from psoas abscess.

Calculi of the Kidney.

136. *Calculous collections* in the pelvis of the kidney have been said to give rise to a fremitus or sense of crepitation on pressure; but although, both as a palpable and stethoscopic sign, it should be kept in mind and sought for, yet it is evidently of very rare occurrence.

Atrophy of the Kidney.

137. *Atrophy of the kidney*, such as occurs from *granular disease*, is marked by a diminished extent of the natural renal dulness; but so difficult is this to detect at the bed-side, that the sign becomes virtually valueless.

Thickening and Dilatation of the Ureter.

138. This condition may occasionally be perceived by careful

and deep palpation over the course of the duct. When distended with urine, the tumour has been observed to have an elastic feel, and its contents to be capable of being discharged by pressure into the bladder. When not thus distended, it is perceived to be hard, cord-like, and somewhat moveable. It has been noticed to pulsate also, by transmission of impulse from the iliac artery.

Enlargement of the Supra-renal Capsule.

139. The supra-renal capsule may be so much enlarged as to produce palpable tumour in the situation of the kidney, displacing this organ, and occupying its seat. This, however, is of very rare occurrence. A case is recorded by Rayer in which the colon occupied its normal position in front of the tumour, which thus, from its physical signs, could not be distinguished from the kidney.

DISEASES OF THE DIGESTIVE CANAL.

Diaphragmatic Hernia.

140. The signs of the passage of portions of the digestive canal through an opening in the diaphragm are those which mark absence of the displaced organs from their normal situation, their presence in the chest, and the displacement and compression of the organs proper to the thorax. All these signs are the more evident and distinctive, the greater quantity of the digestive tube which may have passed up. If the hernia have occurred to any great extent, and the patient be examined prior to the occurrence of strangulation or meteorism, the absence of the displaced organ may be marked by a corresponding sinking in of the abdominal parietes. If the stomach be displaced, its percussion note may be entirely absent from its normal seat, or is very much limited in extent. The presence of more or less of the intestinal tube or stomach in the left side of the thorax is indicated by the ermanent dilatation of the latter to the eye and on measure-

ment; while the respiratory movements of the lower ribs, and of the left side of the abdomen, are arrested. *Percussion* indicates the resonance of the digestive tube, either stomachal, colonic, or intestinal, over a space corresponding to its contact with the thoracic parietes. This is most extensive, for the most part anteriorly, and may be traced upwards to within one or two inches of the clavicles, and may pass somewhat to the right of the sternum. The resonance may, possibly, not be of precisely the same character anteriorly and posteriorly, or even on adjoining parts of the same aspect of the thorax, in consequence of different portions of the digestive tube which may chance to be behind the spot percussed. Over the same extent, the respiratory murmur and voice sound, with the vocal tactile vibration, are absent, and, in place of them, the various sounds described as belonging to the several portions of the digestive tube may be heard. In proportion to the bulk of the hernia, the left lung is compressed upwards and backwards, and its percussion sound will consequently be duller than natural, partaking, however, towards their line of junction, more or less of the special character of the adjacent portion of the digestive tube. In like manner, not only will the respiratory murmur be limited to the upper and posterior regions of the chest, but it will probably acquire more or less of the bronchial character. The displacement of the heart to the right is of very constant occurrence, and is indicated by the usual signs,—alteration in the seat of impulse, in the position of the sounds, and of the percussion-dulness of the organ. When strangulation has occurred, the signs are so far altered as to present in addition those of obstruction of the intestines, of fulness above the portion strangulated, and of emptiness below. Where dilatation of the side and increased resonance are perceived, the only disease with which diaphragmatic hernia could be mistaken from a similarity in their physical signs, is pneumo-thorax. This, however, presents a more uniform tympanitic resonance, while the auscultatory phenomena are very different.

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Displacement of the Stomach.

141. *Displacement of the stomach* may not only occur through the diaphragm into the chest, and through openings in the abdominal wall into herniæ externally, where the organ may be recognised by its dulness on taking a full draught of liquid; but it may assume a more or less abnormal position within the abdomen, as the result of pressure, or in consequence of traction and gravitation brought into operation by diseases affecting itself, or organs adjoining and connected with it. In great abdominal distension, whether from intestinal enlargement, tumours, or peritoneal collections, the stomach may, like the liver or spleen, be displaced upwards towards the chest: in cases of general abdominal retraction, from emptiness of the intestines, or where the diaphragm is detruded downwards by disease on the left side of the chest, it may occupy a somewhat lower position than customary; or it may be detruded laterally, occupying a position more to the right in enlargements of the spleen, or more to the left in those of the liver or gall-bladder. In whatever direction it may occur, the displacement is indicated by the absence of the physical signs of the stomach from their customary seat, and their presence in the unnatural and new position of the organ. A common form of displacement from pressure or enlargement of the liver, is that in which the pylorus descends, and the long axis of the stomach becomes vertical. This may without difficulty be detected by percussion; and, when flatulence is conjoined, it may be indicated also by fulness on the left side of the abdomen. The dislocation of the stomach to the lower regions of the abdomen is commonly the result of traction or gravitation, and is accompanied by dilatation, and an altered form of the organ.

Dilatation of the Stomach.

142. *Dilatation of the stomach* may be moderate, or so extensive as to occupy almost the whole abdomen, overlying the

intestines, or forcing them into the pelvis. It occurs as the result of other diseases, such as bulimia, narrowness of the pylorus by cancer or hypertrophy, or coarctation of the first part of the duodenum. Perhaps it ought, therefore, to be considered in connexion with the signs of these lesions, but there is a convenience in regarding and treating of it as a separate disease. The degree of enlargement and accompanying displacement will modify the signs derived from physical examination. When the organ is greatly enlarged, its weight and that of the accumulated ingesta which it contains, carry it down towards the lower regions of the abdomen, sometimes even to the pubic symphysis. When the stomach is full, the dilatation is indicated by visible and sometimes great enlargement of the abdomen, so much so as to have led to the suspicion of the existence of ascites. If the patient be erect at the time of examination, the gravitation of the ingesta may cause the greatest fulness to be observed at the lower part of the parietes, while the upper part is comparatively flattened; but if the examination be made as he lies upon his back, this difference of the upper and lower regions disappears. When the organ is not displaced downwards so remarkably as has been described, the enlargement is exhibited in the upper half of the abdomen and umbilical region. The whole of the surface corresponding with the enlarged stomach is deficient in elasticity; sometimes the margin of the organ may be indistinctly traced by the hand. A sense of gurgling may be perceived on sudden pressure; and fluctuation, either obscure or distinct, is sometimes noticed in the depending part. *Percussion* elicits resonance over all the superior part of the organ occupied by gas; but below the level of the liquid which the stomach may contain, there is dulness, while the "humoric sound" may be elicited at the line of level itself. The position of all these sounds, however, may be altered by altering the posture of the patient, and thus favouring the gravitation of the contents of the stomach in certain directions. The gurgling on pressure, from admixture of air and liquid, and the sound of fluctuation elicited by succussion, *can be heard* both on application of the ear, and at a distance from the patient, and both of these signs, together with those arising from the churning of the contents of the stomach after meals, are remarkable for the length of time they may persist, and for the distance at which they are heard from their natural locality. They have an amphoric character, and are accompanied often with metallic tinkling.

143. After vomiting, and when the stomach contains no food, the enlargement of the abdomen may lessen; or, if it continues in consequence of gaseous distension, the hand will perceive elasticity over it. When full of gas, the enlarged organ can often be distinctly traced by the eye through the thinned parietes of the abdomen. The percussion-sound is resonant, and characteristic of the stomach; the resonance extending downwards as low as the latter descends into the abdomen, and sometimes laterally into the flanks. If the patient be examined for the first time when the stomach is thus empty, there may be no satisfactory means of determining its lower limit except by noticing the seat of dulness after a large draught of liquid, or listening to the spot to which it appears to fall.

Flatulent Distension of the Stomach.

144. This condition may occur without displacement, and differs from that last described in the organ not being permanently enlarged, but only distended by a more or less temporary accumulation of gas. When the distension is excessive, the upper part of the abdominal parietes is evidently much fuller than the lower; the epigastric region, sometimes as low as the umbilicus, presenting a rounded, even, prominent fulness. The lower boundary of the organ can, in some cases, be traced by the eye. There is fulness or deficient depression below the margin of the ribs on the left side, with a fulness and prominence of the lower ribs and their cartilages, contrasting with the normal state upon the opposite side. The lower *measurements* of the left side of

the chest equal or even exceed those of the right, and the expansion of the left side of the chest and abdomen during the acts of inspiration are less than natural. In great distension, there may be signs of elevation of the left side of the diaphragm. On *pressing* over the epigastric fulness, there may be diminished resistance, with a feeling of thinness of the parietes; or, on the other hand, there may be augmented tension and increased elastic force opposed to the pressure. *Percussion* elicits a drum-like tympanitic note over the whole extent of the organ, which may encroach on the natural dulness of the liver and spleen, and, according to the degree of dilatation present, extend downwards towards the lower part of the abdomen. On *auscultation*, the stomachal sounds are unusually extensive, and present more or less of the metallic tinkling character, which may also attach itself to the sounds of the heart as heard over the organ.

Contraction of the Stomach.

145. *Contraction of the stomach*, resulting from irritant poisoning, or from diseases which interfere with its due repletion, is recognised above all, by the limited extent of its percussion-sound, and of those presented by auscultation, and by these signs being constant at all times and under all conditions. The gastric bulge may be less marked than natural, and there may be unusual hollowness below the margin of the ribs, unaltered by the ingestion of food.

Hypertrophy of the Stomach.

146. *Hypertrophy of the walls of the stomach* produces no *visible* fulness of the exterior of the abdomen; but, on *application of the hand*, there is perceived at the epigastrium a sense of tumour and resistance, more or less defined, extending towards the left side, beneath the margin of the cartilages of the ribs. On *percussion*, the resonance is stomachal, modified in sonorousness by the degree of thickness of the anterior wall of the stomach, and

by the extent to which the hypertrophy encroaches upon the cavity of the organ. The rigidity of its wall interferes also with the increase of the size of the stomach after a meal. When the hypertrophy is confined to the pyloric extremity of the stomach, narrowing of the canal is commonly produced; and, as a consequence of this, the signs of dilatation of the whole organ arise (142), with those of prolonged retention of liquid and alimentary matters. If the hypertrophy is unaccompanied by any adventitious growth, these signs, and perhaps some obscure sense of resistance somewhere in the epigastric or upper umbilical regions, may be the only indications which physical examination can furnish.

Cancer of the Stomach.

147. *Cancer* may affect either the walls of the body of the organ, or the cardiac or pyloric extremity. It may be of various kinds, scirrhus and colloid being the most frequent. *Cancer of the cardiac extremity* results in more or less complete occlusion of the entrance of the organ; and the signs which indicate it are, so far as the abdomen is concerned, the same as if the occlusion arose higher up in the course of the œsophagus. They are, in short, those which arise from more or less complete emptiness of the entire digestive tube, and consequent chronic starvation. On *inspection*, when the disease is sufficiently advanced to produce this effect, the whole of the soft parietes of the abdomen are found retracted, the natural convexity being replaced by concavity, bounded by the salient margin of the framework of the thorax and of the pelvic bones. There may be a trifle less retraction observed below the margin of the ribs on the right side, indicating the position of the liver lower than customary in the cavity; the bulges of the stomach and liver by the side of the thorax are lessened, especially the former, and the costal angles rendered more acute. The pulsations of the aorta may be readily seen and felt as low as the umbilicus. On *measurement*, the lower girths of the thorax and abdomen are lessened,

but the relative proportions of the two sides are preserved. There is lessened elasticity *to the hand* over all the soft parietes; and, if either the liver or spleen extend below the margin of the ribs, they may be readily felt. Any tumour present will be too deeply seated to be discovered, even upon the most careful palpation.* On *percussion*, the resonance of all the hollow organs of the abdomen is lessened, and may even be replaced by more or less complete dulness; and the auscultatory signs of the presence of the intestines or stomach are either wanting or only feebly perceived. In well-marked cases there are also signs of *descent of the diaphragm*, as indicated by those of depression of the liver, spleen, stomach, lungs, and heart. This is the very converse of that which is noticed where, from any cause, the contents of the abdomen are greatly increased.

148. *Cancer of the parietes of the stomach* can only be detected by physical examination when the anterior wall is affected. It then sometimes produces, especially in the colloid variety, fulness of the epigastric region, in which the form of the stomach may sometimes be pretty clearly traced. There is, in addition, an even resisting tumour, with defined lower border; sometimes, though rarely, with defined upper border also, occupying the epigastric and left hypochondriac region; it is resonant on percussion, varying, however, to the extent of absolute dulness in proportion as the organ has become contracted in its cavity, or the latter has become filled with fungous growths. The ingestion of food makes no difference in the extent of the stomach signs.

149. *Cancer of the pylorus* is, for the most part, not indicated

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* This is the result of general experience. Mr. Warren, however, states that a cardiac tumour may be felt very high in the epigastric region, just under the ensiform cartilage, thence extending towards the left, under the cartilages of the ribs. Being but indistinctly felt, it appears to be a large hard irregular tumour not well defined, and not causing any external prominence of the skin.—*Warren on Tumours*, p. 574.

by any *visible* external sign; but when involving neighbouring tissues, as the pancreas and mesocolon, it may produce visible elevation and prominence over the epigastric or upper umbilical regions, which may extend even to the pubic symphysis, and be accompanied by visible pulsation. *Palpation* commonly discovers superficial or deep-seated tumour; but, in the early stage of the disease, it requires a careful search to be made for it at different times in the day, and after recent and full evacuation of the bowels.* There may, however, be considerable tumour present, and yet it will escape the hand from being overlapped by the liver, or obscured by various conjoined tumours within the abdomen. Its usual seat is a little to the right of the median line, and from one to three inches below the margin of the ribs. As the disease advances, and the tumour increases in size and weight, it gravitates more or less towards the lower regions of the abdomen, and may be felt in situations where it might be little expected to be found, such as the umbilical or right iliac regions, the right flank, below the cartilages of the left false ribs, or over the pubes. Its size varies from simple palpable thickening to that of an egg, or larger, and its surface may be either smooth or nodulated. Its consistence is mostly hard, but sometimes it presents a certain amount of elasticity. It is commonly moveable, being found to alter its position a little, according as the stomach is full or empty; descending towards the navel if the patient sits up or stands, and during the acts of inspiration, and moving a little towards either hypochondrium when he turns upon the corresponding side. As in the case of any other tumour, however, there may be such adhesions to the parietes and surrounding organs as to render it completely immoveable, and where the parts behind are involved in the disease, the tumour may be firmly fixed to the spine. It sometimes pulsates, and the pulsation may be most remarkable when the stomach is full. In any case of cancer of the stomach, the palpable signs of tumour may be obscured by muscular resistance to the pressure of the hand. *Percussion* over the tumour elicits a modified dulness. Occasionally there has been *heard* over the tumour a murmur transmitted from the aorta behind it. Pyloric cancer sometimes affects the circumference of the canal rather than the inner surface; but when, as mostly occurs, it encroaches upon the latter, it produces narrowing of the valve, and, as a consequence, all the signs formerly enumerated, of general dilatation of the stomach (142), sometimes with retraction of the lower abdominal region. Hence, these come to be useful aids in the diagnosis of advanced cases of scirrhous pylorus. *Colloid* cancer, while extending further along the body of the organ from the pylorus than scirrhus, and thus giving rise to more extended tumour, leaves, for the most part, the pyloric valve free for the passage of alimentary matters, so that dilatation and its signs less frequently complicate this form of the disease. Even in scirrhus cancer, dilatation is not a necessary sequel of even considerable coarctation, being avoided in cases where vomiting is frequent, and the food is not delayed long in the stomach before it is expelled.

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* A small distinct tumour has recently been noticed by Dr. Jackson, in a patient under his observation, to be produced by a *healthy* pylorus. —*Med. Gaz.*, vol. xlviii. p. 784.

Diseases of the Mucous Surface of the Stomach.

150. Whether resulting in anatomical changes, or merely giving rise to functional disturbance, these diseases offer but few physical signs which can aid in their diagnosis. *Inflammation and ulceration* may produce some fulness and muscular resistance at the epigastrium, and defective abdominal respiratory movement upon the left side. When vomiting occurs to any great extent, or persists for any considerable time, the signs of emptiness of the digestive tube, noticed under "cancer of the cardiac extremity of the stomach," may be more or less fully developed. *Perforation of the stomach* into the peritoneal cavity may be indicated by the occurrence of the signs of gas in the

peritoneum, mostly, however, less marked than in perforation of the intestines, since a smaller quantity of gas escapes. The signs which indicate the existence of peritonitis (172), however, are soon developed. The signs of perforation into the cavity of a hepatic abscess have been already alluded to (95). When *hæmorrhage* has taken place to any great extent, the resonance of the organ may be suddenly replaced by dulness over its whole surface, which is especially distinctive in the course of a chronic affection when accompanied by the general symptoms of hæmorrhage. The signs of prolonged sojourn of alimentary matters in the stomach are noticeable in certain cases of *dyspepsia*, where the irritation has produced a spasmodic closure of the pyloric orifice. There is a form of a gastric disturbance, known as the *dyspepsia of liquids*, and, in cases of this kind, alternate pressure on either side of the epigastrium produces gurgling, which together with fluctuation-sound on succussion, and humoric sound on percussion, is observed long after any liquid has been swallowed; for instance, in the evening, when no liquid has been taken since the morning. When the *stomach is irritable*, the sounds which arise from the admixture of food and gas may be unusually frequent and loud.

Concretion in the Stomach.

151. *A solid concretion in the stomach* may give rise to tumour. Several cases of this sort have lately been recorded. In one of these, related by Dr. Ritchie,* a ball of hair occupied the cavity, and took the form of the organ. The tumour lay in the epigastrium, and encroached a little on both hypochondria, presenting a rounded convex exterior, and a well-defined margin. It simulated the appearance of the liver so strongly, that it was mistaken for that organ, till it was seen that on grasping it through the parietes, and pulling it downward, a considerable hollow space could be produced between its upper edge and the ensiform

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* Edinburgh Monthly Journal, vol. ix., p. 931.

cartilage. Another case, in which the concretion consisted of hair, occurred to Dr. Dickinson.* In this the tumour was situated below the epigastrium, occupying the umbilical region; and it was very prominent on account of the extreme emaciation of the patient. The weight of the concretion may influence the position of the tumour. A remarkable case, illustrative of this, is recorded by Mr. Marshall,† in which the accumulation consisted of pins, which had, from time to time, been swallowed. It weighed nine ounces, and displaced the pyloric extremity of the stomach, in the same manner as organic tumours sometimes displace it. The tumour, which was observed during life, is said to have been of the size and shape of the placenta, and was situated in the left inguinal region. It shifted its position in a transverse direction whenever the patient turned from side to side. All such tumours as these must, from their solidity, present dulness upon percussion; and, if sufficiently high to be overlapped by the liver, their dulness must be continuous with that of the latter organ.

Flatulent Distension of the Intestines.

152. This condition of the intestines may occur in conjunction with distension of the stomach, or apart from it. The colon and the small intestines may be affected together or separately. In either case the distension, if considerable, produces general rounded enlargement of the abdomen, which is even upon the surface, and does not vary with the posture of the patient. When extensive, the umbilical depression is lessened, or may become somewhat prominent. The lower ribs are pushed more or less outwards, and the costal angles increased. When the small intestines are distended, their convolutions and movements are sometimes visible upon the surface. When the colon is affected, its form and outline can sometimes be traced without difficulty.

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* Provincial Medical and Surgical Journal, vol. ix. p. 363.

† Lancet, 1852, vol. i. p. 105.

The respiratory movements of the lower ribs and abdomen are lessened. The lower circular *measurements* of the chest and abdomen are increased; but if the stomach be not distended at the same time, the normal relation of the two sides is preserved. If flatulent distension of the stomach, however, be conjoined there is an excess of semicircular measurement upon the left side. There is a sense of yielding and elasticity, and perhaps of thinning, on *pressure* over the distended soft parietes, varying in different parts according to the condition of the subjacent portion of intestine: but the sense of resistance to pressure may be increased when tension of the abdominal parietes is conjoined. Palpable movement (36) is sometimes perceptible.

Percussion elicits a tympanitic resonance over all the surface corresponding with the distended bowels; it may be of the same tone everywhere, but variations are mostly to be noticed in different parts. Sometimes, but rarely, the resonance is amphoric, with the tinkling echo over some part corresponding to the large, or greatly distended small intestines. The tympanitic sound does not supersede the dulness of the liver, or the peculiar sounds elicitable over the stomach, but merely displaces them. The organs above the arch of the colon and the diaphragm are all pushed upwards; the liver, even when considerably enlarged, may be made to ascend, and its dulness will then be found to extend high into the chest, while some difficulty may be experienced in determining exactly the limit of its lower margin, where it appears to be encroached upon by the resonance of the colon.

On *auscultation*, the sounds heard over the intestines are often abundant, loud, and amphoric in character, and metallic tinkling may be observed: sometimes they are normal.

The *intestinal distension may be circumscribed*, especially when it occurs in the colon: it is then indicated by a fulness in some part of the course of the canal, which may be elastic to the touch, or may simulate a solid tumour by its firmness and defined form. Such a tumour occurring over the cæcum sometimes disappears on exercising firm pressure over it with the flat hand as the patient lies on his back; its subsidence being accompanied by a gurgling sound. In all cases it is resonant on percussion.

Colic.

153. *Colic* is a disease in which the muscular coat of the bowel is affected, so as to result at one time in contraction, and at another in distension; or both of these states may be conjoined, one part of the intestinal tube being spasmodically contracted, while a neighbouring part is distended. These changes and conditions are indicated by corresponding appearances externally, such as general or partial and varying enlargement or retraction. The retraction is commonly noticed, especially in lead-colic, to occur around the navel, while there is fulness in other parts of the abdomen. The retracted parts have a hard, knotty, resistant feel, which sometimes yields to firm continued pressure of the hand, while the fuller parts of the parietes are yielding and elastic. There may be observed, especially over the cæcum and sigmoid flexure, distension and fulness of the parietes, lasting for a short time, and then subsiding with loud roaring borborygmi. On *percussion*, the distended portions of the abdomen give the resonance of gaseous accumulation, while the retracted portions are duller than natural.

Fæcal Accumulations.

154. *Fæcal accumulations* may occur at any part of the course of the colon, but most commonly they are noticed in the cæcum or descending colon, sigmoid flexure, or rectum. When of small amount there may be little or no external indication visible; but when occurring in the situations mentioned, the accumulation is often considerable, and may even be accompanied by inflammatory thickening of the bowel. These larger accumulations produce visible fulness in either of the iliac regions or

flanks, or in the course of the transverse colon, according to their situation. When a flatulent condition of the small intestines is conjoined, the abdominal enlargement is general, accompanied by signs of elevation of the diaphragm; but when this part of the intestines is free from gas, the central regions of the abdomen may be flat, while the parts occupied by the colon may be distended so as to alter the general aspect of the abdominal parietes.

Often, however, it requires the *application of the hand* to detect tumour, and even this may be a matter of some difficulty, from the muscular resistance opposed to it. The most common seat of tumour is the iliac region, or flank upon either side, especially upon the right; but it may be found almost any where in the abdomen, in consequence of the very strange positions which the colon may assume. On account of this, we should be very guarded in an opinion as to the part of the intestine at which the accumulation has occurred, or in denying a colonic origin to an abdominal tumour, merely because of its position. The cæcum, for example, full of gas or fæces, may be removed from its natural position in the right iliac fossa, and lie in the middle line over the inlet of the pelvis, or even in the left iliac region, or it may be displaced upwards into the right flank, or by the side of the vertebral column. The sigmoid flexure, again, may form a tumour either in the right flank or iliac fossa, where it may overlie the cæcum, or in the hypogastrium; while the transverse ascending and descending colon may occupy the most extraordinary situations, and run in the most extraordinary curves. While tumour is thus found in the course of the colon, or while the whole of its length may give a sense of resistance to the hand, the central regions of the abdomen corresponding to the small intestines may present more or less of their normal elasticity. When there is a definite tumour, its form is commonly oval or cylindrical, with some unevenness of surface. When connected with the cæcum, it represents the sac-like shape of this portion of the bowel, and when occurring in the curved course of the sigmoid flexure, it may assume an absolutely irregular form. It is mostly situated just beneath the wall of the abdomen; but when placed in the lower central regions, some coils of the small intestines may lie in front of it, and deeper pressure may be required to arrive at the tumour. Its size may vary from being just perceptible to the hand, to one which may simulate renal, hepatic, or splenic enlargement. A stercoral tumour situated in the hypogastrium, from its situation and rounded form, extending up towards the umbilicus, has been mistaken for the pregnant uterus; but instead of rising from the sides, it was, in a case related by M. Laronde,* apparently intimately connected with them. When the fæcal accumulations are distributed throughout the canal, the whole abdomen may be tense, hard, and tympanitic, and deep-seated tumours may be felt in various parts, resembling those produced by glandular tumour, from which it may not always be easy to distinguish them. Fæcal tumour is sometimes the seat of visible or felt pulsation, communicated to it by the aorta. The mobility of a stercoral tumour will depend upon that of the portion of bowel which it occupies, and upon its freedom from adhesion to the parietes. When it is in the cæcum it is not altered by the position of the patient, or capable of being moved by the hand; in other portions of the tube there is more mobility, but less in the ascending and descending portions than in the transverse or in the sigmoid flexure. When it is in the transverse portion, its position may alter a little with that of the patient, and when in the sigmoid flexure, continued pressure may displace it a little backwards. The consistence of the tumour varies; in all cases it is inelastic, in some quite hard; in others, where the fæculent accumulation is soft, it may have a doughy feel, and be capable of being impressed, and in some degree moulded by the fingers. When the *rectum* is the seat of accumulation, a cylindrical often lobulated tumour is perceived, *on examination by the vagina*, behind that canal, having the inelastic and impressible character just referred to, and being possessed of some lateral mobility. When the accumulation is excessive, it may produce elevation of the uterus, the os and cervix being discovered high up, and situated more forward than customary. The character of the tumour is of course at once discovered on introducing the finger into the rectum.

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* Edinburgh Monthly Journal, vol. xiii. p. 64.

Percussion gives, over the seat of tumour, a sound which, if the bowel be quite distended and free from gas, may be completely dull, without any of the elastic sensation of gaseous intestine; but, for the most part, this degree of fulness is not attained, and the tumour gives, in closely adjoining parts, dulness and resonance. This mixed percussion-sound, in whatever part of the abdomen it may be observed, is very characteristic of the nature of the tumour. When the accumulation has occurred in a part of the colon overlapped by the liver, the margin of that organ presents insufficient resonance on deep percussion.

The situation and size of these fæcal tumours, and the continuity of their dulness with that of known organs, lead constantly to their being mistaken for a variety of other abdominal diseases. The result of active purgation and enemata will often, by removing more or less completely the signs of tumour, dispel all doubt of its origin. It sometimes simulates very closely a solid renal tumour, occupying exactly the situation of the latter in the flank, but it differs from it in not producing fulness in the lumbar region posteriorly, in being less broad, more elongated, and more cylindrical.

Intestinal Concretions.

155. *Concretions* arising from the accumulation of various indigestible matters in the bowels, commonly occur in the cæcum or ascending or descending colon. According to their size and position, they give rise to *palpable* tumour, the form of which is that of the concretion. When a portion of the bowel is dis-

tended with matters of an indigestible nature, through any considerable extent, it may present a cylindrical form. If large, there may be some visible elevation of the surface over its seat. The tumour is hard; and when an accumulation of hard bodies, such as cherry-stones, has taken place—as in a case recorded by Cruveilhier*—a sense of crepitation, resembling that produced by emphysema, has been given to the hand, and a similar sound may be heard on pressure, by aid of the stethoscope. The tumours are often moveable, either by altering the posture of the patient, or by the hands; but this occurs when the concretion is situated in a moveable portion of the bowel, such as the small intestines or the transverse colon. Like fæcal accumulation, the tumour may be the seat of pulsation. *Percussion* elicits a dull sound over the tumour, not varied with resonance, as in fæcal accumulation.

Intestinal Obstruction.

156. *Intestinal obstruction* arises in connection with so many morbid conditions, both of the intestines, peritoneum, and other abdominal organs, that it becomes necessary to describe its signs apart from those of its anatomical causes. It may occur at any part of the bowels from the duodenum to the rectum. Its great physical characteristics are those signs which indicate a state of emptiness below the seat of obstruction, and of fulness and distension above it, increasing in proportion to the duration of the malady, and conjoined, when accompanied by great abdominal enlargement, enteritis or peritonitis, with defective abdominal respiratory movement. The distension occurs principally in that portion of the digestive tube which happens to lie immediately above the obstructed part. Thus, when it is seated in the first few inches of the *duodenum*, the stomach may become dilated, and the signs of this state may be as fully developed as in cancer of the pylorus; and, if early vomiting after food should prevent

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* Anat. Pathologique, liv. 26, pl. 6.

the occurrence of this, the signs before alluded to of emptiness and collapse of the intestinal canal, with dulness, retraction, etc., may, nevertheless, be apparent. When the seat of obstruction is elsewhere in the small intestines, the physical signs of fulness above, and emptiness below, will be regulated, for the most part, by the height of the obstruction, and its distance from, or nearness to, the end of the ileum.

When *at or near the ileo-colic valve*, there are signs of distension of the small, and emptiness of the large intestines. These consist in rounded enlargement of the abdomen both to the eye and to the hand; the convolutions of the small intestines, filled with flatus and liquid fæcal matter, being often traceable, and their vermicular movements visible, through the thinned abdominal wall. They may also be *felt* by the hand, apparently greatly dilated, to rise and roll over with loud borborygmi. The portion of the tube immediately above the seat of obstruction, having become hypertrophied, can sometimes be felt as a resistance, and on *applying the stethoscope* in this situation a gurgling sound may be heard from the mixture of gas and liquid fæces, and sometimes also, where this portion is much dilated, a spontaneous sound of fluctuation or agitation. The distended part of the abdomen is resonant on *percussion* where it contains gas, but dull just above the seat of obstruction from accumulation there of the alimentary or fæcal matters. Where gas and liquid matters are in contact, the "humoric sound" is developed. All the signs, however, of the presence of matters in the intestine may be wanting, where there is sufficient retropulsive action of the bowel to produce stercoraceous vomiting. While there are these signs of enlargement of the small intestines, the colon will be empty, and give no resonance in its course, even the cæcum and sigmoid flexure not furnishing their accustomed sound on percussion. Great general abdominal enlargement, however, with great distension of the small intestines, will completely obscure this sign. There is another, however, which they will not obscure, and which is consequently available to show that the colon is not the seat of obstruction. I allude to the production of dulness in its course, on administering a copious forcible injection, while the liquid may be heard on application of the stethoscope passing along its whole length, even to the ascending colon and cæcum. When the obstruction is *high in the small intestine*, there is mostly flattening of the greater part of the abdomen, or even of the whole of it, with defective resonance on percussion; but even in this case tympanitic distension of the abdomen may occur.

Obstruction of the large intestines, if in the sigmoid flexure or rectum, produces abdominal fulness, either general or in the course of the colon, especially in the left iliac region and flank; the latter regions will then be doughy or inelastic on palpation, and dull upon percussion; the rest of the course of the colon and the central regions of the abdomen varying in resonance according as gas or fæcal matters predominate in the subjacent parts of the bowels. The position of the obstruction in the rectum and sigmoid flexure may be determined by examination with the finger introduced into the bowel; but if it be situated higher than the finger can reach, an elastic rectum-tube may be introduced, and passed up till it meets with resistance. A fallacy attaches to the latter proceeding, inasmuch as the tube may, on reaching the obstruction, become bent downwards and curve back upon itself towards the anus. On injecting warm water an idea may be formed of the distance of the obstruction from the anus, by noticing how much can be thrown up, which is less in proportion to the nearness of the obstruction to the termination of the bowel. When the obstruction is above the descending colon, as *at the gastro-splenic curve* of the bowel, there is not observed that equal fulness of the flanks which is sometimes noticed when the obstruction is in the sigmoid flexure or rectum; but, while the left flank is not fuller than customary, there is fulness, with dulness on percussion, in the course of the transverse colon and right side of the abdomen. A flatulent state of the small intestines, however, may equalise the fulness of the two flanks. If it occur *at the hepatic curve*, the fulness, dull upon percussion, is remarkable on the right side and in the right iliac region, so as to produce the most obvious and positive deformity, and may even be observed posteriorly over the lumbar region. When the obstruction is seated only *a little above the cæcum*, this may form a large dilated tumour in the right iliac region, extending upwards and to the left. The nearer the obstruction, also, to the ileo-colic valve, the greater is the evident distension of the small intestines, so that, in the case of its proximity to the cæcum, there are visible also, in most cases, through the abdominal parietes, the form of the distended convolutions of the bowels, and their peristaltic movements of elevation and depression. There is, however, no situation in which obstruction may occur, especially if long unrelieved, in which the signs which I have described may not be obscured by general and symmetrical abdominal fulness, with tympanites and elevation of the diaphragm, the result of extensive flatulent distension of the digestive tube. When one side of the abdomen is fuller than the other, there is a corresponding increase of the semicircular measurement of that side, as well as of the general girth of the abdomen. The administration of a large injection will indicate, by the height to which its dulness may be traced by percussion, and the extent to which the liquid may be heard to pass along the canal, the situation of the obstruction, when this occurs anywhere in the large intestine.

Inflammation of the Intestines.

157. Until inflammation has produced some marked structural change in the course of the small or large intestines, physical examination gives but little assistance in its diagnosis. In some cases, especially in that condition of the intestines which characterises typhoid fever, there may be present the signs of flatulent distension of the canal (152). Local inflammation, as in duodenitis, may give rise to local prominence. When much tenderness

is present, or in a nervous subject, much muscular resistance may be offered to the pressure of the hand, and irregularities on the surface of the abdomen may be perceived from spasmodic contraction of the muscles of the parietes, together with defective abdominal respiratory movement. When the inflammation is limited to one portion of the canal, these signs may only be displayed over the corresponding part of the abdominal wall. Some time ago, Dr. Stokes * drew attention to the occurrence of abdominal pulsations in cases of enteric inflammation, extending perhaps to the iliac and even to the femoral arteries. In *typhoid fever*, pressure in the right iliac region often developes a gurgling sensation to the hand, indicative of the conjoint presence of gas and liquid. The gurgling is also to be heard, and percussion may develope the true humoric sound. The same signs may occur over any other part of the abdomen, where similar physical conditions exist. The occurrence of excessive and prolonged *diarrhœa*, whether resulting from disease in the large or small intestines, often produces signs of emptiness of the digestive canal, retraction of the abdomen, with deficient resonance on percussion, etc. The occurrence of ulceration is unmarked by any distinctive signs until *perforation* occurs. When this takes place into the peritoneum, it produces signs which indicate the presence of gas, either generally effused into the cavity of the peritoneum, or limited to some portion of it by adhesion.

158. *Inflammatory thickening* of the intestinal tube often arises as a result of the irritation of retained and accumulated excrementitious matters; and remains even when these have been fully discharged. It may occur *in the small intestine*, where careful palpation may detect it, giving the idea of a thickened tube which may be made to roll under the hand, and is less resonant on percussion than other parts of the small intestines. Its most common seat however is the cæcum or sigmoid flexure of the colon.

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* Dublin Journal of Medical Science, O. S., vol. v. p. 438.

159. *Inflammatory thickening of the cæcum* occurs in the typhlitis of Dr. Burne, and is a common accompaniment and sequel of fæcal accumulation in that portion of the bowel. It produces, if the cæcum be dilated to any extent, fulness in the right iliac region, and more resistance to the hand than in the left iliac region. Palpable tumour also may be observed, more or less deeply-seated according to its size, and more or less defined; not changing its position with the movements of the patient, and being immoveable by the hand. There may be muscular resistance over the seat of tumour, and rigidity of the right rectus muscle. When this rigidity does not exist, the abdominal wall can be felt to have no connexion with the tumour. The tumour may be so chronic in its duration, and so hard to the touch, as to be mistaken for one of ovarian origin. On percussion, there are found less resonance and less elasticity in the region of the cæcum than over other portions of the intestine. The tumour may become adherent to the abdominal wall, and, either through the adherent part, or posteriorly where uncovered by the peritoneum, the thickened bowel may be *perforated*, and then a circumscribed emphysematous tumour, crepitating under pressure, may present itself anteriorly above Poupart's ligament, or posteriorly by the side of the quadratus lumborum muscle; and the abscess will discharge itself upon the surface.

160. When the thickening affects the *sigmoid flexure*, it forms in the left iliac region a palpable elongated tumour, rolling under the hand, and duller on percussion than other portions of the tube. It is not an uncommon result of dysentery or dysenteric diarrhæa. It may be accompanied by more or less muscular resistance to the pressure of the hand, the rigidity being sometimes specially observed to affect the left rectus muscle. This tumour, like that of the cæcum, may become adherent to the parietes, *ulcerate through* them, and form an abscess over Poupart's ligament containing fæcal matter and gas, and giving to the hand a soft and emphysematous feel, and crepitating under pressure. When the thickening of the canal occurs *in the*

descending colon, it may form a sac or cyst, giving to the hand the sensation of a firm deep-seated swelling in the left flank, capable of being mistaken for an enlarged spleen, but varying at different times, according to its state of fulness or collapse, and dull or resonant on percussion according to its contents.

Where the thickening at any part narrows the canal of the bowel, the signs of intestinal obstruction described above (156) may become superadded.

161. *Perforation* may occur in other directions than those above referred to: one portion of the intestine may become adherent to another, and communication may take place from one into the other; or the intestine, mostly the colon, may become adherent and communicate with the stomach; or adhesion and perforation may occur between some portion and the bladder or the generative passages. Experience has at present given no diagnostic physical sign of any of these conditions, if we except, as the plan of our work requires, the appearance in the vomited egesta, in the urine, or in the discharges from the vagina, of matters presenting the characters of the intestinal contents.

Cancer of the Intestines.

162. In *the small intestines*, the jejunum and duodenum are the parts commonly affected, and the signs produced are those already noted (158) as belonging to thickening of the tube from deposit of a non-malignant character, and ultimately those of intestinal obstruction (156). Tumour assuming the form of the intestine may thus be felt as a thickened coil under the finger, or it may assume a more or less circumscribed and rounded form. When ascertained to lie between the colon and the margin of the liver, and to be from its resonance non-hepatic, it may be presumed to belong to the duodenum. The tumour is more or less fixed and irregular upon the surface, and less resonant than other portions of the bowels; its character may also be judged of by its extension towards the deeper seated parts, as felt by the hand

Flatulent distension of the bowels may easily obscure the indications of tumour.

163. Cancer occupying the *large intestines* is more readily detected; the tumour it produces will correspond in situation with the portion of the canal invaded, occupying the right iliac region when affecting the cæcum, the left iliac region and hypogastrium when it affects the sigmoid flexure, and crossing the abdomen when it affects the transverse colon. In the left iliac region its shape is often irregular from implication of the peritoneum and adjoining tissues, and it is fixed and immoveable. In the transverse colon its form is mostly oval, the long diameter being transverse. Its surface is more or less irregular. It may be moveable or fixed, the latter if it be adherent or if it implicate other tissues. In any part of the colon it may, if extensive, produce visible fulness over its seat. A pulsation forwards may be transmitted from the aorta when the tumour lies over the course of that vessel. Its resonance on percussion is defective, or it may sound absolutely dull. In proportion as it encroaches on the canal of the bowel, the signs of obstruction (156) become superadded, which vary, of course, according to its seat. I have noticed colloid cancer have the effect of shortening remarkably the length of the colon; when occurring in the ascending part it may thus occasion the transverse colon to cross the abdomen considerably below the navel, while in colloid of the transverse portion the cæcum has been raised out of its natural situation in the right iliac fossa, and manifested the signs of its presence in the flank. Cancer *of the rectum* produces the signs of obstruction in this portion of the tube, which may be perceived on examination with the finger or bougie. When the growth occurs from its anterior surface it may produce some anteversion of the uterus (193), perceptible on examination by the vagina, or the tumour of the rectum may be discovered posterior to that canal.

Intussusception or *invagination.*

164. This is one of the causes of obstruction of the bowels.

It is said to be capable of physical diagnosis by the *sudden* appearance of tumour of elongated form and rolling under the finger, together with dulness on percussion, at a time when the symptoms of intestinal obstruction are present. Of course the only period when this sign can be expected to be perceptible is prior to any considerable enlargement.

Tænia.

165. The presence of *tænia* has been said to be marked by dulness on percussion over the part of the bowel in which it is situated, and by the sound on auscultation before described (79), but which hitherto I have never been fortunate enough to hear.

DISEASES OF THE PERITONEUM.

Ascites.

166. *Peritoneal dropsy* occurs under two conditions of the serous membrane. In the one, which will be first described, the membrane is apparently in its normal physical condition; in the other, it has undergone a change in its thickness and other physical characters which modifies somewhat the signs of liquid effusion into its cavity. *Inspection* affords but little information when the amount of liquid in the cavity of the peritoneum is but small, any trifling enlargement being readily referred to increase of gaseous matter in the digestive tube, an idea which may be confirmed by its variation from time to time. As the effusion accumulates, the general fulness of the abdomen becomes more permanent and decisive. When the quantity of liquid present is abundant but not excessive, and there is at the same time no considerable flatulent distension of the intestines, the abdominal enlargement is most obvious at the depending parts, its special seat varying with alterations in the posture of the patient. Thus, when standing (the posture in which a patient is for the most part first examined), the fulnes

is most remarkable below the level of the umbilicus, bulging out the wall symmetrically, while the upper part of the abdomen, that above the umbilicus, either presents its customary convexity, or exhibits some degree of apparent or comparative flattening. When the patient is placed upon the back, the fulness below the navel is less marked, and the flanks become bulged outwards symmetrically, while there appears comparative flattening of the whole anterior face of the abdomen. When placed upon either side, that part which is uppermost becomes flattened, while that which is undermost exhibits bulging. These signs are unaffected by the varying conditions of the stomach as to emptiness or fulness. When the amount of liquid has become excessive, there is presented on inspection that degree of enlargement which has been already described as "general abdominal enlargement" (7). The external indications of the upward limit of the abdomen are observed much above the natural level, the costal angles are greatly increased, the margins of the cartilages of the lower ribs and the xiphoid cartilage are everted, and the umbilicus is flattened or protruded. The surface becomes uniformly and symmetrically globular and smooth, and though still a little more fulness is observable in the depending parts than elsewhere, yet the effect of the gravitation of the liquid is less remarkable than in the earlier stages of the disease. In some instances the superficial veins of the abdomen are enlarged. The respiratory movements are modified much in the same way and to the same extent as in flatulent intestinal distension.

When the ascites is moderate, and occupies only the lowest part of the cavity, the distance of the navel from the pubes is somewhat increased proportionally to that between the navel and sternum: but as the effusion advances, and the tension comes to be exerted upon all parts of the abdominal parietes, the space between the umbilicus and the lower extremity of the sternum is also lengthened, and ultimately may proportionally exceed the measurement of the lower space.

The circular *measurements* of the trunk are greatly altered, their relative proportions being nearly reversed; that at the level of the umbilicus being the greatest, and often that at the level of the nipples being the least; the other girths being intermediate. Even when this extreme condition is not presented, there will be less than the natural diminution of girth from the level of the nipples to that of the bottom of the sternum, and from this to the lower margin of the false ribs. The semicircular measurements are symmetrical.

The *palpable signs* of ascites are still more characteristic than those just described. On passing the hand over the distended parts the evenness of the enlargement becomes more apparent than to the eye alone, and on pressing inwards the abdominal wall, the hand perceives a diminution of the normal softness and elasticity, and in place of them a sense of resistance and weight, whose principal seat will vary with the part which the posture of the patient renders dependent. The sense of weight is increased as the liquid accumulation becomes excessive. At the same time, the upper regions of the abdomen present the natural elasticity of the subjacent parts of the digestive tube, or sometimes even a greater degree of elastic softness than is customary in the healthy state. But the most valuable palpable sign of ascites is fluctuation, which is perceived in the depending parts wherever the fluid lies in contact with the soft parietes. When the wall is tense and the fluid serous and abundant, the waves are finer, and follow more quickly upon the impulse than when the wall is more flaccid and the liquid of a less watery consistence. This sign is readily obscured by any condition producing thickening of the abdominal wall, such as œdema, or subcutaneous fatty accumulation.

Percussion also indicates the position and amount of the effused liquid, the parts in contact with it giving a dull sound, accompanied by a sense of resistance to the percussing finger. It commences, as the patient stands, above the pubes, and on tracing it upwards from the hypogastric and iliac regions, it is found to present at a certain height a line of level passing horizontally across the abdomen. Above this line the resonance of the intestines is discoverable, occupying thus the epigastric and umbilical regions: it may either present its normal character, or be more tympanitic than natural. The dulness is very obvious on light percussion with light pressure of the pleximeter, but on pressing more deeply, the liquid is capable of being displaced, and the wall brought in contact with the hollow intestines, their resonance being then elicited on percussion. This manœuvre will always elicit resonance near the line of level, and for a certain distance below it varying with the amount of liquid in the cavity: but above the pubes, if the ascites be considerable, it is rarely possible to obtain any resonance at all. The amount of depression requisite to arrive at it, indicates the thickness of the layer of liquid at any given spot. If the abdomen be percussed as the patient lies on the back, the resonance of the hollow intestines is mostly found extending over the umbilical region, and lower down towards the pubes than when erect, and the hypogastric region and flanks will be dull. If the patient be placed upon the side, the flank which is uppermost is resonant, while that which is lowermost is dull, and the line of level of the dulness will be parallel with the long axis of the trunk. After each alteration in the posture of the patient, a few minutes should be allowed to elapse prior to examination, in order to give time for the adjustment of the liquid and the hollow viscera according to their relative gravity. When the quantity of ascitic fluid is small it may accumulate in the cavity of the pelvis, where it is beyond detection by the hand, or by percussion applied above the pubes. In such instances the patient may be placed for some minutes upon the right side, with the pelvis raised a little so as to favour gravitation towards the right iliac region. The dulness of liquid in that situation may thus be made to supersede the natural resonance of the cæcum, and the palpable signs of weighty resistance and fluctuation may render its presence certain. In the case of infants, the fluid may be made to gravitate from the pelvis, and the dulness may be developed in the umbilical and hypogastric regions, by holding the child for some minutes in the horizontal posture with the anterior part of the trunk downwards.

According to the degree of the abdominal enlargement there are added the signs of *detrusion* upwards of the liver, spleen, and stomach; the pulmonary resonance, breath sound, and vocal vibration, not descending so low as natural, sometimes not lower than the fourth rib in front, the apex of the heart being also perceived to lie high up and to the left. The compression of the lungs under these circumstances is also indicated by more or less tubular breath sound in the interscapular region, especially of the left side. For the most part the uterus retains its natural position, but when the vagina is relaxed it may happen that the whole uterus may be displaced downwards, or that the fluid may press forward the posterior wall of the canal, an event more likely to occur when any retroversion of the uterus is conjoined.

167. Of the several diseased conditions of abdominal organs which have already been passed in review, there are two especially which deserve notice here in connexion with ascitic accumulation: one of these is gaseous distension of the digestive canal; the other is tumour, whether arising from the displacement or enlargement of solid organs, from abnormal growths or deposits, or from accumulations within the hollow viscera. The conjunction of *flatulent intestinal distension* (152) with ascites in all stages and degrees of serous accumulation, tends to destroy the visible indication of gravitation of the fluid to the depending parts, and to render the abdominal fulness more equable, uniform, and rounded in all postures of the patient. Moreover, by rendering the soft parietes more tense, it causes the fluctuation wave as felt by the hand to be smaller, sharper, and more immediate upon the most trifling impulse. *Solid tumour* of every kind is obscured by the intervention of the fluid of ascites between it

and the soft parietes of the abdomen. On practising sharp, quick, depression of the wall with the ends of the fingers, however, they may be perceived to impinge upon some solid substance, the extent and character of surface of which may to a variable extent be ascertained. In order to make use of this sign it often becomes necessary, according to the seat of the tumour, to vary the posture of the patient, and thus to favour either gravitation of the fluid away from the tumour, or of the tumour towards the wall. It is as much a sign of ascites as of the presence of a tumour. Sometimes repercussion (41) may be obtained.

168. In estimating the *daily variations* in the amount of liquid effusion, the examination should be made on each occasion in the same posture at the same time of the day, and the stomach and bowels should be as nearly as possible in the same condition as to fulness. At all times when a patient is examined for ascites, it should be seen that the bladder has been recently and completely evacuated. The line of level of the percussion dulness, and the exact line along which the measuring tape has been applied, should be daily marked upon the surface. If the level of the liquid as determined by percussion be lower than on a previous examination, and if the intestinal note be more readily obtained by pressure of the pleximeter, and at the same time the circular measurement of the lower parts of the trunk be lessened, the effusion may be certainly pronounced to be. diminished; but if the line of level be remarkably higher, the intestinal resonance less readily obtained on pressure, and the circular measurements increased, no doubt can exist that the amount of effusion is greater.

169. *Abscesses and cysts of various kinds*, and the distended receptacles of secretions, such as the urinary or gall-bladder, may *burst into the cavity of the peritoneum.* The effused liquid then represents the fluid of ascites, and, when sufficiently abundant, either alone, or together with the liquid products of the inflammation occasioned by the accident, may be recognised by the

signs of that state above enumerated (166), modified, however, by those which peritonitis (172) may add.

170. *Complication of ascites by peritoneal thickening and shortening of the duplicatures of the membrane* modifies, in some degree, the physical signs of that condition. The results afforded by inspection and measurement are much the same whether the peritoneum be thus altered or not; but the palpable and percussion signs are somewhat different. The resistance to the pressure of the hand is greater, and an idea of thickness in the parietes is afforded, as well as of weight from displacement of the liquid. After tapping has been performed, instead of the wall feeling soft and lax, it may give to the hand more or less of the impression of a stiff empty cyst. Fluctuation, if not less perfect, is yet more obscure, according to the thickness of the parietal membrane, and the waves appear larger. As in the simple form of ascites, there is dulness on percussion wherever liquid extends; but the difference between them lies in the impediment which the shortening of the peritoneal duplicatures, and possibly the agglutination of the intestinal coils amongst themselves may offer to the floating upwards of the latter, and to their contact with the soft parietes in the umbilical region. When this is the case there will be dulness on percussion over this region, which, in ordinary ascites, is resonant. On pressing back the parietes at the umbilical region, unless the intestines are quite bound down to the spine, their resonance may be arrived at.

Hæmorrhage into the Peritoneum.

171. *Hæmorrhage* may occur into the peritoneal cavity, not only as the result of accidental injury, but from the rupture of an aneurism, the sac of an extra-uterine pregnancy, rupture of the spleen, etc. The blood in contact with the living tissues remains liquid for a long time, and, when sufficiently abundant, may be detected by the signs of fluid in the peritoneal cavity already described (166). Sometimes a coagulum forms in the pelvic cavity

occupying the rectovaginal pouch. It is then discovered by palpation through either the vagina or rectum, or through both, blocking up the whole, or a great part, of the pelvic cavity, feeling like a mass of malignant disease,* raising the uterus (190) and pressing it forwards, and displacing the bladder upwards or to one side (185).

Acute Peritonitis.

172. Peritonitis may be diffused or local. *Diffused* peritonitis varies like inflammation of other serous membranes in its products, according to the sthenic or asthenic state of the individual it attacks. In the one instance the predominant effusion will be fibrinous matter or organisable plasma; in the other, liquid matters of various degrees of consistence according to the predominance of serous or of corpuscular elements. Peritonitis, of whatever type it may be, does not exist long before it produces gaseous distension of the intestinal canal, the signs of which condition (152) become early observed in the course of almost every case of this disease. The signs of elevation of the diaphragm are in few diseases more strongly marked than in severe peritonitis. Both to the eye and on *measurement* the abdominal respiratory movements are noticed to be nearly abolished, while those of the superior part of the chest are proportionally increased. According to Dr. Sibson,† the abdominal movements at the sides are not so much lessened as in front, especially if the peritonitis have not seriously affected the surface of the diaphragm, or the serous covering of the liver, spleen, or stomach. The rythm of the respiratory acts is altered, the expiratory act being shortened.

Palpation is commonly much impeded by the extreme tenderness of the abdomen; but, when the hand is applied with pressure, much muscular resistance is perceived. The effusion of lymph is far less constantly indicated by physical signs than the occurrence of a similar effusion upon the surface of the pleura or pericardium. When they are observed, however, the signs are of the same nature, being those of palpable and audible friction. The friction vibration is less commonly to be felt than the friction sound is to be heard. Neither of them can be developed, unless there be a certain amount of resistance to pressure offered by the part against which the parietes are applied. For their occurrence as a result of the diaphragmatic movements during respiration, it appears necessary that the resistance should be afforded by some solid substance upon which the lymph is effused. Hence it is that friction phenomena accompanying the respiratory acts are only perceived over the region of the liver or spleen, or over some abnormal solid tumour. Under these circumstances friction is often noticed during the inspiratory act alone, and is most obvious when the inspiration is deep. When the lymph is deposited in other situations, pressure and movement of the parietes with the hand may be necessary to develope it. Its occurrence independently of these two sources of motion, and coincident with the peristaltic movements of the intestines, not only points to the surface of these organs as the seat of the deposit, but also lends a degree of probability to the assumption that their surface is rendered harder than usual, more resistant, and rougher, by the deposit of tubercles, etc. It also shows that the intestines are free to move. Experience appears to favour the idea that the occurrence of friction is most frequent at that stage of effusion, and under circumstances which immediately precede or accompany the formation of adhesion. It is at all times a very variable sign, and, to be discovered at all, must mostly be frequently sought for. It may only be noticed for a single day, or when once perceived, may again be undiscoverable after a much briefer interval.

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* Guy's Hosp. Reports, N.S., vol. vii., p. 131.

† Op. Cit., p. 384.

The effusion of fluid is indicated by the percussion signs which point to its existence in ordinary ascites. When trifling in amount, it must be made to gravitate to a favourable spot for detection, as in the lesser degrees of ascites; but more time must be allowed for the change of posture to operate, in consequence of the greater consistence of the effused liquid. Its presence, as in ascites, is indicated by the resistance it offers to the pressure of the hand, when this is not superseded by muscular resistance, by the dulness on percussion, and by more or less evident fluctuation. The quantity of effusion may, in some cases, be as abundant as in ascites, and then the aspect of the abdomen and the other physical signs are the same as in that disease (166): the umbilicus may become very prominent, and form a large and fluctuating projection; or there may be a special pointing at some other spot on the abdominal parietes.

173. *Local peritonitis* varies in its physical signs, according to the part of the membrane affected. Prior to the formation of abscess, its signs are those of increased muscular resistance, locally, to the pressure of the hand, with deficient respiratory movement of the same part, as determined both by the eye and by the aid of the "chest measurer." The indications of effusion of lymph, namely palpable and audible friction, as well as of liquid effusion, if the latter be not circumscribed by adhesions, will be the same as those noticed under the diffused form of the disease.

Peritoneal Adhesion.

174. *Peritoneal adhesion* occurs, as the result of serous inflammation of various abdominal organs among themselves, or between these organs or tumours and the corresponding part of the parietes. The principal sign which indicates that adhesion is about to take place between any part and the parietes, is the occurrence of palpable or audible friction over the spot; but when the adhesion has become firm and close, the signs are those which show that the part is immoveable. Thus, when it occurs over the liver, this organ is shown, by percussion, not to descend as it ought to do with the respiratory movements, especially when adhesion of the base of the right lung is conjoined, and not to be displaced at all by flatulent or other distended

states of the stomach and colon, while it offers an impediment to the descent of the diaphragm on that side, as indicated by defective inspiratory expansion. Where a palpable tumour is adherent, the parietes are found not to be moveable over it, or only to be moveable with it; and it does not descend with the acts of inspiration, as ascertained by the hand or by percussion. The existence of adhesion between known organs, or between them and abnormal tumours, is shown by an inability to separate them distinctly by palpation, or to move them separately or in different directions, so as to obtain a resonant interval between them. Other signs of adhesion between special parts will be noticed as they severally pass under consideration. The *omentum* not uncommonly forms an adhesion by some part of its fold to the parietes in the neighbourhood of the pelvis, or to some of the pelvic organs; and the stretched omentum may form a band, beneath which a portion of intestine may become compressed. This cause of internal strangulation and obstruction may, according to Schuh,* be diagnosed, by the discovery, on palpation, of a kind of hard cord immediately posterior to the parietes of the abdomen, directed straight or a little obliquely upwards from the lower part of the belly, and losing itself insensibly above. Along with the unequal distension of the abdomen which marks the obstruction of the bowel, there will, under these circumstances, be a depression along the course of the stretched omentum, which is duller than other parts upon percussion. Too much reliance, however, must not be placed in this sign, as its presence must be very rare; and I have known a similar cord-like sensation imparted to the fingers by the obliterated urachus.

Circumscribed Peritoneal Abscess.

175. *Circumscribed abscess*, enclosed by adhesions, may occur anywhere in the sac, as the result of local or general peritonitis. When near the soft parietes, it is indicated, if sufficiently large,

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* Archives Gén., 4me ser., tom. vii., p. 85

in addition to muscular resistance to pressure and deficient respiratory movement over its seat of formation, by more or less local fulness, with palpable hardness and dulness on percussion. The tumour and dulness do not alter with changes in the posture of the patient, or with the acts of respiration. Sometimes, especially at an early stage, the abdominal wall can be made to move over it. The hardness varies much in its diffusion or degree of circumscription, sometimes becoming more sometimes less defined in its outline as it progresses. As it extends and approaches the surface it commonly becomes softer, and some amount of bogginess or fluctuation is perceived. When occurring *between the folds of the omentum* it is apt to take a sinuous course, extending more or less irregularly amongst them, so as to produce, with the inflammatory thickening by which it is circumscribed, a palpable hard and immoveable tumour across the abdomen above the navel, which can only be distinguished from a solid growth by its acute course, and by the accompanying subjective phenomena. An abscess of this kind may form *upon the diaphragmatic surface of the liver*, and may simulate, by its physical signs, abscess of the parenchyma of the organ in this situation, extending the dulness of the liver, detruding the organ below the margin of the false ribs, as perceived by the hand, producing signs of elevation of the right half of the diaphragm, and obstructing the abdominal respiratory movements upon that side. It may point between the lower ribs on the right side, and may burst and discharge itself like abscess of the liver, either upon the surface or into the chest, or simultaneously in both directions. When situated across *the upper part of the abdomen*, it may produce fulness across the epigastric and hypochondriac regions, and dulness on percussion continuous with that of the liver, perhaps some elevation of the diaphragm, and a general deficiency of the abdominal respiratory movements. It may even obscure the resonance of the stomach upon percussion. When localised abscess occurs *near the umbilicus*, this fold may become prominent more or less distended and fluctuating, and may burst, allowing the abscess to discharge itself through the opening. Such an abscess may, like a hernial protrusion, receive an impulse on coughing. When seated *over the hypogastrium*, it may resemble, by its physical signs, a distended bladder, but catheterism will obviate error. A common situation for abscess is one or other of the *iliac regions*, since it may originate on the one side from disease of the cæcum or appendix vermiformis, and on the other from disease of the sigmoid flexure. On the right side the abscess may commence as a deep-seated hardness, over which the parietes and muscles can readily be made to move, subsequently forming a tumour more or less circumscribed, as large as the closed fist, or even more extensive. Another situation for these abscesses which deserves mention is *the lower part of the pelvis*, namely, the rectovaginal pouch of the female, or the rectovesical pouch of the male. In either case, examination by the rectum will readily detect the tumour, more or less soft, prominent, rounded, and fluctuating; but in the female it will also protrude inwards the posterior wall of the vagina; and its characters can be more easily ascertained than in the male, from the facility of using a finger in each canal. When a cyst containing pus has formed between the bladder and the uterus, the latter may be slightly retroverted (192).

176. Abscess in these situations, as well as in other parts of the abdomen, sometimes *communicates by ulceration with the canal of the intestines;* the contents of the latter become extravasated more or less abundantly into the sac, and mixed with its secretion, and then what is called a *fæcal abscess* is formed. The only physical signs which *perforation* adds to the circumscribed abscess, are those which indicate the pressure of gas; there may be perceived a sense of crackling like that of emphysema, or a gurgling on pressure of the hand; percussion may elicit, according to the contents of the sac and the freedom of communication with the intestine, resonance with or without metallic tinkling or "humoric sound;" and auscultation with

pressure may detect sounds indicative of the passage of gas through a narrow opening or through liquid, the latter being of a gurgling character, perhaps amphoric, and accompanied by metallic tinkling. Abscess from perforation of the appendix has been known to form a tumour high enough in the flank to simulate a renal tumour, lying between the crest of the right ilium and the lower ribs; and in such a case the deception may be favoured by the colon being perceived, by percussion and auscultation, to lie in front of it.

Chronic Peritonitis.

177. Several of the diseased conditions which have just been described result from a certain degree of chronicity in the peritonitis, but, under the term "*chronic peritonitis*," are here included only those cases in which the morbid change affects the membrane more or less generally. In the confirmed disease, the abdomen is for the most part generally enlarged, and large superficial veins may be visible upon the surface. *Where the cavity of the peritoneum contains any fluid*, as it sometimes does for a certain period, its signs will be those already described under ascites—namely, some increase of fulness in the depending parts with dulness and obscure fluctuation. In some cases the cavity communicates with the canal of the bowel, and *fæcal extravasation* is conjoined: pointing may then take place at some part of the parietes, or there may be protrusion and thinning of the umbilicus, and through an opening in one of these situations the contents may be discharged. The fluid may be confined by adhesion to one side of the abdomen, which in such a case may be the sole seat of visible fulness, dulness, and fluctuation, with increase of the semicircular measurement; or it may be limited in a similar manner to the lower part of the cavity, forming in either case a kind of encysted peritoneal dropsy.

The *signs of fluid may be wanting* from the first, or after persisting for a brief period may disappear, adhesion occurring between the parietes and subjacent parts. The abdomen may then exhibit upon its surface the visible form and movements of the subjacent intestines: it feels tense, the wall being immoveable upon the organs beneath, and the parietes and the abdominal contents appear to be hard, as if forming one mass. The sensation imparted to the hand has been otherwise described as if there were a firm band encompassing the abdominal contents, over which the skin and muscular tissues only could be moved. The wall is very tense, resisting the pressure of the hand; but still, when strong pressure is used, it is found to be elastic. Percussion is everywhere clear, and may even be tympanitic, except there be scybalous accumulations or circumscribed collections of fluid, rendering the corresponding part of the parietes dull. Sometimes the abdomen, in place of being enlarged, is found flatter than natural or retracted, and then the tympanitic resonance will be absent, and the peritoneal thickening and narrowing of the calibre of the intestines will be indicated by deficient resonance or dulness in the percussion sound. Where local *obstruction of the intestines* is produced, the signs of this condition already described (156) are exhibited.

178. *Tuberculous deposition* in the folds of the peritoneum or accompanying the products of chronic peritonitis, if to any considerable extent, produces signs similar to those of non-tuberculous peritonitis, in addition to which there are indications of abnormal deposit, in the existence of palpable and visible tumour in some one or more parts of the abdomen. The most common seat of abundant tuberculous deposit is the *omentum*, which, in these cases, almost constantly forms a palpable superficial tumour, mostly of an elongated form, crossing the abdomen somewhere above the umbilicus or near its level, extending from one hypochondrium to the other, and lying in about an equal degree on both sides of the median line. It has often a marked border above and below, is hard, more or less irregular on its suface, and either fixed or somewhat moveable. If not adherent it may be discovered to descend a little during the act of inspiration. It may be so extensive as to simulate an enlarged liver. It may

be the seat of pulsation and murmur communicated from the aorta. It is dull upon percussion, and bounded by resonance above and below, and when simulating enlarged liver, it is mostly separated from that organ by a resonant space. In some instances the tumour does not cross the abdomen, but extends from the margin of the ribs on the left side to the umbilicus, simulating a large spleen, from which its less ready mobility will distinguish it, unless it happen to be adherent. When conjoined with ascites either none of the tumour may be felt or only a small part, which happens to be adherent to the parietal peritoneum. In some cases occurring in children, where the tuberculous deposition has been confined to the omentum, the abdomen generally has been observed to be flaccid and supple. When the tuberculous omentum encloses part of the transverse colon, its dulness will be less perfect than where it is gathered up entirely along the great curvature of the stomach. Where the omentum is greatly thickened, and forms a considerable tumour, it may have the effect of proportionally lengthening the distance of the navel from the lower extremity of the sternum. *Other tumours* may be perceived in addition to those which can be referred to the omentum, placed irregularly about the abdomen, elongated in various directions, and either separate from one another and from the omental tumour, or connected together and appearing as offsets from the latter. These tumours arise from the tuberculous false membranes between the intestinal convolutions, and are bounded and separated by resonance, although dull upon percussion themselves. All these tumours occupy the same position from day to day, and are unaffected by changes in posture of the patient or by purgation. A case is recorded by Dr. Barlow,* in which an abundant tuberculous deposit took place between the layers of the right *mesocolon* forming a large tumour; and in which two other tumours of a similar character, but smaller in size, were found between the layers of the mesentery. The signs observed were the following: "The abdomen was much distended, and there was a large lobulated tumour occupying the right iliac fossa and inguinal region, and extending upwards and to the left, so as to occupy the greater portion of the umbilical and pelvic regions: there appeared also to be a portion of intestine crossing it anteriorly towards its lower portion." This tumour was "supposed to be a tumour of the right kidney." As in non-tuberculous peritonitis, *ascites* may be conjoined with the diseased condition of the membrane. In this case the tumours may be capable of being felt through the liquid by means of sudden deep pressure; or, if this be impossible, they may be discovered after tapping. The tips of the fingers may then sometimes be insinuated beneath the margin of the omental tumour. When the false membranes have been especially firm at the lower part of the abdomen about the inlet of the pelvis, forming a firm band extending from the pubes to the sacrum, the latter has been known to prevent the rise of the fundus of the urinary bladder, so that when full it has pressed upon the vagina, causing the anterior wall to protrude, and even to appear externally. Tuberculous peritonitis may not only be conjoined with ascites, but also with *circumscribed abscess* and *fæcal extravasation* (175, 176), whose local signs will then be added to those of the general disease of the membrane.

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* Guy's Hosp. Reports, O. S., vol. vii. p. 18.

179. *Tuberculous disease of the mesenteric glands.*—Until this has attained a considerable degree of advancement, it cannot be detected by any physical indications. In the latter stages of the affection, however, there is some general enlargement of the abdomen, often with enlargement of the superficial veins, which present a tortuous appearance, joining with those on the chest. In rare instances, depression or retraction of the anterior parietes has been observed. The anterior wall of the abdomen rarely presents any tenseness *to the hand*, but generally yields readily to its pressure: it may, however, be expected to be tense where chronic tuberculous peritonitis (178) or tubercle of the omentum are conjoined. The sound on *percussion* is not tympanitic,

unless gaseous intestinal distension be conjoined. *Palpable tumour* may not be discoverable even when the tuberculated glands form a mass of considerable size. To perceive this sign it is essential that the abdomen be soft and flabby, so as to allow of the depression of the anterior wall as far back as to the vertebral column. When the tumour is perceptible, it is always situated somewhere near the navel, close upon the vertebral column, is hard to the touch, and unequal upon the surface, feeling as if composed of a number of agglutinated masses. In some cases the tumour is fixed, in others it appears somewhat moveable, but both this and its size may seem to vary from day to day according to the tension of the wall, and the state of fulness of the intestinal tube with gas or fæcal matters.

Cancer of the Peritoneum.

180. When affecting the free surface of the membrane, without forming a tuberous mass, this disease cannot be detected by any distinguishing physical indications. In one case alone within my knowledge, where the *parietal peritoneum* was infiltrated with colloid, the umbilicus presented a stretched as well as flattened appearance; but this was in a case where there was general enlargement of the abdomen conjoined, and where the part of the parietes corresponding with the navel was infiltrated. The abdominal wall was tense, and on sliding the hand over the surface, several small tumours about the size of a nut could be felt within it, unconnected with any solid organ beneath. After death they were found to consist of small hard flattened tumours beneath the parietal peritoneum. The *omentum* is a common seat of cancerous growth: it mostly forms a tumour across the upper part of the abdomen, which may extend from the epigastrium nearly to the pelvis, producing when extensively diseased local prominence and bulging, as well as palpable tumour. For the most part the tumour is equally extensive on both sides of the median line, but may, occasionally, where the

omentum has previously become adherent to the lower part of the abdomen, form a tumour on the right side. It is superficial, unless separated from the wall by ascitic fluid, hard, more or less unequal upon the surface, and presenting a distinct lobulated edge. It is dull on percussion, except where it encloses a portion of the transverse colon, and there is mostly resonance between its upper part and the margin of the ribs. It may feel as if adherent to the anterior parietes, and does not, under this condition, descend at all during the acts of inspiration. Malignant disease of the peritoneum, including the omentum, has been known to simulate closely a hepatic tumour. A case of this kind is on record,* in which there were apparent "two or three lumps of the size and shape of half an egg, near to the scrobiculus cordis, and the whole upper part of the abdomen presented one uniform hard substance, almost as firm as cartilage, giving a general and equal fulness to the abdomen: this hardened condition extended almost to the pelvis, where there was a distinct lobulated margin to be traced in the form of the lower margin of the liver: this descended lowest on the right side, and was also low on the left, where one or two lumps were to be felt like independent tubers separated from the general mass." After death it was found that the peritoneum was thickened to nearly a quarter of an inch in some parts, and a large mass very firm descended into the pelvis, and there assumed the form of the liver with a division between its lobes. This mass included the liver and stomach both diminished in bulk. When affecting the *small omentum* or the glands on the under surface of the liver, tumour resembling that of hepatic cancer, with nodulations upon its surface, may appear beneath the margin of the ribs on the right side, its dulness on percussion being continuous with that of the liver. Cancer affecting the *mesocolon* and its glands may produce a tumour in a similar situation. When the cancer affects the fold of the *mesentery* and its glands, it may form a palpable tumour either fixed or somewhat moveable, and dull upon percussion, below and a little to the left of the umbilicus, rising towards the margin of the ribs on the left side, but unless very large not passing beneath them. Both this and cancer of the omentum may be the seat of pulsation and murmur communicated from the aorta. The tumour may become so large as to occupy a very great extent of the abdomen, and may perhaps present some obscure fluctuation; when pressing much upon the large venous trunks of the abdomen, there may be considerable enlargement and tortuosity of the superficial veins of the parietes. Masses of encephaloid cancer are not uncommonly found about the *lower part of the abdomen*, the sigmoid flexure, broad ligaments of the uterus, etc. Beside local fulness, and sometimes enlargement of the superficial veins of the abdomen, irregular tumour in the iliac or hypogastric regions will be perceptible; and when the tumour extends into the cavity of the pelvis, and lies immoveably betwen the bladder or the uterus and the rectum, it may be felt by the finger in the rectum or vagina as well as by the hand pressing back above the pubes. In such cases the uterus mostly becomes fixed, either by adhesion or by implication in the morbid mass. A cancerous tumour should not be manipulated roughly, since it might be broken down if containing much blood in its substance, as is often the case with masses of encephaloid cancer. In a case of *colloid cancer of the peritoneum*, recorded by myself,* there was an effusion of gelatinous matter into the peritoneal sac, indicated during life by general and extreme enlargement of the abdomen to the eye and on measurement, with great elevation of the diaphragm as in ascites, dulness on percussion everywhere but at the epigastrium and along the margin of the ribs on the right side, and the most perfect fluctuation in every part.

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* Guy's Hospital Reports, O. S., vol. v., p. 308.

Hydatid Disease of the Peritoneum.

181. No affection of the abdomen presents to the eye such serious and extensive deformity as this in its advanced stage.

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* Medico-Chirurgical Transactions, vol. xxxi. p. 119.

General enlargement of the abdomen is visible on *inspection*, and is exhibited by measurement. It commonly commences as a local dilatation of the superior part of the abdomen, with protrusion of the hypochondria, extending downwards from this part towards the pelvis. In addition to this there are visible numerous rounded or oval elevations, which often aid in giving to the abdomen a most irregular and unsymmetrical appearance; and while the general girth of the abdomen is increased, the measurement of the two sides may be unequal. Even at the most advanced stages of the disease the enlargement and circular measurement of the upper half of the abdomen commonly remain greater than of the lower; and the umbilicus is proportionally much nearer to the pubes than in health. It may appear to commence with the signs of hydatid disease of the liver, and when once perceived, the enlargement increases with great rapidity. In a case recorded by Dr. Bright,* the abdomen presented two rounded and large protuberances, as if from two sacs, one at the upper, and the other at the lower part, between which was a resonant sulcus, into which the hand might be laid, due to the colon lying in a depression which crossed the tumour in a transverse direction. The obstacle presented to the descent of the diaphragm lessens or entirely destroys the abdominal movements in respiration. The encroachment of the abdomen upon the thoracic limits, as evidenced by the diminished extent downwards of the pulmonary resonance, etc., and by the elevation of the heart's apex, is perhaps more remarkable than in any other disease occasioning general abdominal enlargement. The exterior of the parietes is commonly marked by reticulations of enlarged veins.

Palpation renders perceptible to the hand the same superficial irregularity that is manifest to the eye, and the form and size of the rounded cysts may be pretty clearly ascertained through the abdominal wall. The natural soft and elastic feel of the abdomen, and the *resonance* due to the intestines, are limited to the part to which they are displaced and confined, which may be one or other of the lumbar regions or flanks, one of the iliac regions, or some circumscribed spot near the anterior parietes. All the rest of the surface is dull on *percussion*. The cysts under sufficiently favourable circumstances may fluctuate obscurely, and may manifest the hydatic fremitus. It is not necessary, however, that hydatid disease should invade the peritoneum so generally as has been described, since a cyst containing hydatids, may produce a tumour of variable size in any part of the peritoneum. When the hydatid disease affects the *omentum* alone, without extending to other parts of the peritoneum, the indications of the disease may be limited to the upper part of the umbilical region, where prominence and oval tumour, dull upon percussion, may be manifested. Nothing but the perception of the hydatic fremitus will certainly distinguish it from other forms of tumour in this situation.

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* Guy's Hospital Reports, O. S., vol. ii., p. 441.

Gas in the Peritoneum.

182. The passage of gas by *perforation* into the peritoneal sac may have the effect of filling it generally, or the gas may be limited by adhesion to some particular locality. *When it is generally effused* there is uniform general *enlargement* of the abdomen to the eye and on measurement, which forms with more or less rapidity, and does not present the gravitative character of the enlargement in ascites. If it be extensive, the umbilicus becomes prominent, and the signs of elevation of the diaphragm are exhibited. The anterior parietes, though distended, are remarkably elastic, yield readily to the *pressure of the hand*, and may impart to it at the same time an idea of thinness. The sound on *percussion* is tympanitic, the depth of the note being regulated by the tenseness of the wall, and the quantity of gas present. The great peculiarity of it is, that, except where adhesion interferes, it is uniform over the whole surface, even over the seat of the natural dulness of the liver, and over that of any tumour which might have been previously perceived.

Even when a tumour is adherent to the anterior parietes, unless it be large, and adherent over a large part of its surface, it may both be lost to the touch, and its dulness may disappear on percussion.

183. *Circumscribed gaseous accumulation* may be located in almost any part of the peritoneum, either from the passage of gas into a part of the cavity, which is all that adhesion has left unclosed, or into a circumscribed space, from which fluid had passed through a *perforation* into some part of the digestive canal. The former is indicated by the signs of gas in the abdomen being limited to the non-adherent part; but, in the latter instance other signs are often added, in consequence of the simultaneous presence of some of the liquid secretions which the cavity at first contained. In addition, then, to elasticity to the touch and resonance on percussion more or less suddenly developed, perhaps coincidently with a discharge of pus by the bowels, pressure may develope a sense of gurgling, and there may be metallic tinkling on percussion. In a case recorded by Barth and Roger,* the gaseous tumour gave a sense of crepitation to the hand; and, on compressing it with the stethoscope, crackling sounds were perceived, gurgling, and a peculiar sound indicative of the passage of the intestinal gas through a narrow aperture.

DISEASES OF THE ORGANS WITHIN THE PELVIS.

Distension of the Bladder.

184. *Distension of the bladder* with urine produces on *inspection* an increased fulness over the pubes: as the enlargement of the organ increases, this rises higher and higher towards the umbilicus, which, in extreme cases, it may reach or even surpass, producing fulness of all the lower part of the abdomen, with increase of circular measurement, symmetrical on the two sides. Unless displacement

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* Traité pratique d'Auscultation, 1850, p. 531.

be conjoined, the fulness occupies the middle line, extending from it laterally and symmetrically towards the iliac fossæ, and presents in some cases the form of the distended organ which occasions it. It is unaltered in degree or position by changes in the posture of the individual. Over the locality of fulness greater resistance *to the hand* is met with than is natural in that region, but less than would be observed were the fulness due to a solid body rising in a similar manner out of the pelvis. The elastic feel of the region also is impaired, but not wholly destroyed. Where the abdominal wall is sufficiently lax, and the muscles oppose no spasmodic action to the pressure of the hand, superficial tumour may sometimes be discerned, which exhibits the size, form, and symmetrical disposition of the distended bladder. In a case mentioned by Mr. S. Cooper, it was the seat of strong pulsations.* Fluctuation may sometimes be perceived in the tumour, or over a circumscribed space above the pubes; it is mostly more obscure and less superficial than where the liquid occupies the peritoneum, but sometimes has been so distinct that ascites has been believed to be present. It is not affected in its seat or extent by changes in posture. The distended bladder may be felt on *examination by the rectum or vagina*, before becoming apparent to the eye or hand above the pubes, as a rounded, elastic, and fluctuating swelling proceeding from the fore part of the pelvis, bulging inwards the anterior walls of these canals, and becoming somewhat tenser during efforts at micturition. When the organ has passed the pubic symphysis, and come in contact with the abdominal wall, it occasions complete dulness on *percussion* in the corresponding part. This dulness extends upwards as high as the bladder itself in the middle line towards the navel, its lateral extent being symmetrical and proportional to its height. Its upper border is bounded by a curved line, and there is never any resonance between the dulness of the abdomen and the pubic symphysis. The position and circumscription of the dulness are unaffected by alteration of the posture of the patient, and consequently, when he is placed upon the side, the corresponding flank remains resonant, unless other disease be present to interfere with the sign. Depression of the wall with the pleximeter fails to elicit any intestinal resonance over the dull portion of the abdomen.

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* Surgical Dictionary, p. 4.

Displacement of the Bladder.

185. The bladder may be *displaced* as well as distended. When displaced upwards and to one side, it may occasion a visible fulness and palpable superficial tumour above the pubes, lying altogether on *one side of the median line*, or even in the iliac fossa, and at the same time no tumour may be felt through the vagina which can be determined as belonging to this organ. With the exception of the position of the dulness, which corresponds with that of the felt tumour, its percussion signs resemble those above described (184). The passage of a catheter indicates elongation of the urethra, taking a direction usually upwards and forwards; and, by evacuating the urine, demonstrates the nature of the abdominal tumour. Another displacement deserving notice takes place *downwards*, and sometimes accompanies prolapsus of the uterus. It occasions a tumour external to the vulva, which varies with the degree of fulness of the bladder, is dull upon percussion and sometimes fluctuates. The displaced bladder may either lie in the general pouch formed by the extrusion of the uterus, or it may exhibit a distinct swelling or bulge between the cervix uteri and the pubic arch. In any case the catheter shows an altered direction of the urinary meatus backwards and downwards.

Hydatid Cyst in the Pelvis.

186. *A hydatid cyst occupying the pelvis* is liable to be mistaken not only for a bladder distended with urine, but for other tumours of pelvic organs. It may thus occasion hypogastric fulness, and a resistance or palpable tumour, dull upon pe

cussion, rising above the pubes, both being unaffected by alteration in posture. It may also project inwards the anterior wall of the rectum. The resistance it offers to the finger on examination through the rectum, is, perhaps, greater than that occasioned by a distended bladder, and its form and the position of its dulness above the pubes in respect of the median line may be less symmetrical. Catheterism shows that the urethra is altered in direction upwards and forwards, but it effects no diminution in the bulk of the enlargement unless a distended bladder be conjoined. Fluctuation is obscure, or may be absent, or only be felt indistinctly through the rectum. The diagnosis would be rendered more precise were the hydatic fremitus perceptible, and were similar tumours discovered in connexion with the liver or elsewhere in the abdomen. When occurring, as it occasionally does, in the recto-vaginal pouch of the female, it forms a palpable, elastic, perhaps fluctuating tumour, perceptible through the posterior wall of the vagina, and resembling closely an adherent ovarian encysted tumour occupying the pelvis. The diagnosis can scarcely be made by the aid of the physical signs alone; the history and progress of the case must be carefully considered as elements in its formation.

Pelvic Inflammation and Pelvic Abscess.

187. Inflammation and abscess affecting the cellular tissue, included within the fold of the broad ligaments of the uterus, and lying beneath the peritoneum covering this organ and its appendages and the parts adjacent to the generative organs, are observed not only as a sequel to delivery, but independently of parturition or pregnancy. The inflammation very commonly involves more or less the ovaries or Fallopian tubes. When suppuration occurs, the abscess may extend in almost any direction along the pelvis, or the cellular inflammation may be accompanied or followed by the effusion of the products of inflammation on the free surface of the peritoneum, or by the formation of adhesions between the

pelvic viscera. The earliest physical indication of this disease is mostly obtained by *vaginal examination.* On pressing the finger against the wall of the vagina laterally or posteriorly, near its attachment to the cervix, an unusual sense of resistance is perceived, and a "brawny hardness" which permits of no yielding to the finger. In many cases, especially at the outset of the disease, the resistance is undefined, but in others a distinct tumour may be traced, firmly connected with the body of the uterus or apparently belonging to it, and mostly immoveable. It may appear to be fixed to the rectum: examination by this canal may show that it is pressing on its anterior wall, while the lower part of the tumour is more readily definable than by examination through the vagina. When only one ligamentum latum is affected, the body of the uterus may be drawn over to the affected side; but other displacements of the organ may occur, according to the seat and extent of the abscess. In many cases the uterus acquires remarkable fixity, being incapable of elevation by pressure made upon the cervix. In some cases no indication of tumour is afforded by this method of investigation, or the signs enumerated only present themselves subsequently to the occurrence of tumour above the pelvis. On the other hand, throughout the affection there may be no sign appreciable by *examination through the abdominal parietes,* all the physical indications being confined to examination through the vagina or rectum. When, however, abdominal exploration does manifest signs of the disease, the first indication usually consists in muscular resistance to pressure over the hypogastrium, or over one or other of the iliac regions. At a subsequent period there is perceived some fulness on *inspection,* and, if the condition of the parietes permits of its definition, a hard and tense smooth *tumour* is felt in one of these situations, which appears to rise from the pelvis or to be connected with its posterior wall. At first it may be ill circumscribed, the readiness with which it may be defined being greater as its size increases. It is unaltered by the operation of purgatives. The abdominal parietes are freely moveable over it, and if it rise high enough the tumour itself is capable of some movement by the hands. When there is also a tumour felt by the vagina, an impulse upon the tumour above the brim of the pelvis may be transmitted to the finger placed on the tumour within the vagina. The abscess may burrow along the iliac fossa, and form a tumour rising even as high as the umbilicus. In an advanced stage of the abscess, fluctuation may be perceived in the tumour, either through the abdominal wall, vagina or rectum. The abscess may point and burst in various situations; a common situation is into the vagina near its attachment to the cervix, or into the rectum. It may point externally on the abdominal wall, sometimes preferring the external inguinal or crural ring, and the swelling in these situations may have an impulse communicated to it by coughing. There is dulness on percussion over the surface corresponding with the abdominal tumour, which is unaltered by changes in the posture of the patient. In some cases peritoneal friction may be felt and heard.

Displacements of the unimpregnated Uterus.

188. Three kinds of displacement may be enumerated. In the *first,* the entire organ undergoes a change in its position in the pelvis, with only secondary alteration in the direction of its axis; in the *second,* the axis of the organ is remarkably changed in direction; and in the *third,* the organ is flexed in such a manner that the axis of the cervix and that of the body do not correspond, but form an angle the one with the other.

Entire displacement.

189. *Displacement downwards* may occur in various degrees: when the organ still remains within the pelvis, but only occupies a lower level than customary, the altered position is called *prolapsus;* but when the whole organ or a part of it escapes

beyond the vulva and lower boundary of the pelvis, it is distinguished as *procidentia.* Displacement without extrusion may occur to a very slight amount, or in every degree short of procidentia. According to the degree of descent of the womb, there may be observed some flattening to the eye or hand above the pelvic brim, unless this sign be destroyed by such contemporaneous affections as ascites or intestinal flatulence. The direct method of ascertaining the *prolapsus* is by *vaginal examination.* It is then discovered that the os and cervix uteri are arrived at unusually soon by the finger; sometimes being found lying just at the entrance of the vagina. The vagina itself is loose, broad, and lax, and partially inverted in such a manner by the descent of the uterus, as to allow of the finger being carried beyond its attachment to the cervix, for a considerable distance upwards by the side of the body of the organ. Unless in cases where some additional impediment is offered, pressure on the uterus, especially if aided by a recumbent posture, will raise it more or less readily to its natural position; and, if it be not enlarged, no remarkably increased sense of weight is perceived. On the patient resuming the erect posture, however, the womb soon regains its morbid position. According as it descends towards the vulva, the direction of its axis becomes slightly changed, as a result of its new position, in order to correspond with that of the outlet of the pelvis. In *procidentia,* more or less of the uterus forms a visible projection from the vulva, and at its lower extremity the os uteri and cervix are readily recognised. A fold of the inverted vagina may lie anteriorly and posteriorly, the former containing a portion of the bladder, the latter a portion of the rectum. In complete procidentia, a large tumour is visible hanging between the thighs, whose outer surface is the inner wall of the vagina. The tumour or sac thus formed may contain not only the uterus, whose size and form may be detected by handling the part, but also the bladder, the rectum, small intestine, or ascitic fluid, the presence of each of which may be ascertained by appropriate physical examination.

190. *Displacement upwards* occurs as the result of pelvic diseases, which force up the uterus contrary to gravity; or as the result of tumours connected with it, rising out of the pelvis into the abdomen and drawing up the uterus along with them. In all cases the *vagina* is perceived to be elongated, and for the most part also to be considerably narrowed: the finger passing for a long distance along the canal before it reaches the os uteri: in some instances the elevation is so great that the os uteri cannot be reached at all. On *examination by the rectum*, the uterus is either not to be felt at all, or at an unusual height in the pelvis. On passing a catheter into the meatus urinarius, that canal is perceived to be elongated, and to be directed unusually upwards and forwards. When, in these cases, the uterus preserves the inclination of the axis of the pelvic inlet, the organ can sometimes be perceived by the hand above the pubic symphysis, capable of being moved in any direction, if not adherent, and dull upon percussion. There may be also a little increased fulness above the pubes. Where the diagnosis is difficult, assistance may be gained by the use of the *uterine sound*, which, when introduced through the os, passes upwards and forwards in the direction of the inlet of the pelvis; and, if the parietes of the uterus and abdomen be not thick, its extremity may be felt through them above the pubes, indicating the seat of the fundus. When the uterus is not adherent in its new situation, the tumour felt above the symphysis may be perceived to move coincidently with the handle of the sound.

191. *Displacement laterally* presents no tumour either in the vagina or above the pubes; the cervix is not necessarily either above or below its natural elevation, presents the correct direction of its axis, but lies on one side of the middle line. It only occurs coincidently with pelvic disease shortening the lateral ligament of one side, or pressing the organ out of the middle line.

Inclination, obliquity, or version of the uterus.

192. *Retroversion.*—It has already been alluded to that the uterus acquires some inclination backwards in prolapsus; but retroversion may occur to a far greater extent without any, or with very little descent of the organ. It must be kept in mind, however, that prolapsus may be conjoined with the most complete retroversion. Where the retroversion is considerable, slight flattening above the pubes may perhaps be observed, and sometimes also part of the posterior wall of the vagina may appear externally beyond the vulva. The displacement can only be satisfactorily determined by vaginal examination. There is then felt through the posterior wall a solid, convex, smooth and resistant tumour, which, unless adherent, or when fæcal accumulation has occurred in the rectum above it, is somewhat moveable, but not to any great extent. On examination by the rectum a similar tumour is felt through the anterior wall; this may be embraced, and its thickness judged of, by the introduction of a finger into each canal simultaneously; its form and size are thus perceived to be those of the fundus of the uterus. The canal of the rectum is narrowed opposite the tumour. No solid tumour can be discovered above the pubes, or, at all events, none which can be recognised as the fundus of the uterus. The cervix uteri is felt to have assumed a new direction; it is no longer directed downwards in the axis of the pelvis, but is tilted upwards and forwards into a horizontal position, or one in which the os is directed upwards towards the upper part of the pubic symphysis, or in which it lies above it. The relative level of the fundus and cervix uteri will thus vary with the degree of version; in the slightest degree of retroversion (obliquity or inclination) the fundus occupies, as in health, a level above the cervix; in higher degrees they lie on the same horizontal plane; and, in the highest degree, where the os lies behind the pubic symphysis, the cervix is above and the fundus below. In some cases of the latter

kind, the finger cannot be made to reach the os uteri at all, and the vaginal and urethral canals are elongated and directed upwards and forwards, as in the upward displacement of the uterus. The position of the cervix in retroversion is such as to interfere with the due evacuation of the bladder, so that the signs of retention of urine and distension of the bladder (184), are commonly conjoined. When *pregnancy* or any other cause of uterine enlargement accompanies retroversion, the tumour between the vagina and rectum will of course be much larger than when these conditions are absent, and may even fill the greater part of the cavity of the pelvis.

193. *Anteversion.*—In this displacement, again, the uterus assumes a horizontal position, but the os and cervix are directed backwards and upwards towards the hollow of the sacrum, while the fundus is to be felt as a rounded tumour through the upper part of the anterior wall of the vagina. The posterior wall of the vagina is much stretched, and some difficulty is often experienced in arriving at the os uteri. The cervix may be felt in its new position through the anterior wall of the rectum. When the abdominal parietes are sufficiently lax, the hand pressing downwards behind the pubes, and the finger in the vagina, may embrace between them the body and fundus of the organ. The tumour is moveable, unless adhesion has occurred.

194. *Lateral inclination.*—In this form of displacement the fundus of the uterus lies towards one side of the median line, while the cervix and os are directed towards the opposite. So long as the uterus lies at its natural height in the pelvis, this can never occur to any great extent, and is only to be detected by the altered direction of the body and cervix, as perceived by vaginal examination and by the use of the uterine sound. When upward displacement of the organ is conjoined, it can occur to a much greater extent. In such cases, if the os be low enough to be reached, it is perceived to be inclined towards one side of the inlet of the pelvis. The rounded fundus is not felt in the median line above the pubes, but at one side of the

hypogastrium, into which situation it has, perhaps, been pushed by some tumour, which has also been the cause of the elevation of the entire organ. The *uterine sound* furnishes, if requisite, additional evidence of the position and direction of the fundus; and, by means of this instrument or by handling externally, the organ, if not adherent, will be found moveable, or may even be restored to its natural position in the median line.

Flexion of the uterus.

195. *Retroflexion.*—A tumour possessing similar characters to that observed in retroversion (192) is formed by the fundus of the uterus behind the posterior wall of the vagina; but the cervix either retains its natural direction, or, when the angle formed between it and the body is small and acute, may be directed somewhat backwards; or, when large and obtuse, slightly forwards; in the last instance the retroflexion is conjoined with some retroversion. On passing the finger along the cervix posteriorly, it distinguishes the angle formed between the two portions of the uterus. In some cases, the tumour of the fundus may only be capable of detection by examination through the rectum. On passing the *uterine sound* through the os, it takes a direction at first upwards in the axis of the cervix, and then downwards and backwards in that of the body and fundus; through the wall of which its extremity may be felt by the finger introduced either into the vagina or the rectum. Distension of the bladder is not observed in pure retroflexion as a result of the displacement.

196. *Anteflexion.*—In this form of displacement, again, the cervix is felt in its natural position, unless anteversion be conjoined. By passing the finger along the anterior surface of the cervix, its point can be introduced into the angle formed between the cervix and the body; and, as in anteversion, the body can be felt through the anterior wall of the vagina, and can be raised by pressure of the finger. This, however, cannot be effected

where the anteflexion is due to an organic contraction of the anterior part of the uterus; and, in a recorded case of this kind,* in which it was conjoined with prolapsus, the os uteri was even felt to be directed forwards. If requisite, the uterine sound may be used, as in retroflexion, to determine the altered direction of the cavity of the body of the uterus.

197. *Lateral flexion* is marked by similar signs to lateral version; the only difference being that the os and cervix retain more or less their position in the median line. When conjoined with much upward displacement, the finger cannot reach high enough to appreciate the angle formed by the cervix and the body, and the uterine sound must be employed to establish the diagnosis.

Pregnancy.†

198. The earliest sign of this condition which *inspection* furnishes, consists of a slight flattening of the abdomen above the pubes; it never occurs to any great extent, and, unless the attention be specially directed to its discovery, may altogether escape observation. It is often counterbalanced, or even superseded, by more than natural fulness occasioned by a flatulent state of the intestines, which not uncommonly accompanies the first stages of pregnancy. The period at which it is to be observed is during the second, and beginning of the third month; and it is due to the inclination backwards of the fundus of the uterus, which, at this period of gestation, precedes its rise from the pelvis into the abdomen. In the course of the third month,

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* Boivin and Dugés, "On Diseases of the Uterus" (Heming's translation), p. 110.

† An apology may be necessary for introducing the subject of the signs of pregnancy in connection with *diseases* of the organs within the pelvis. The convenience arising from this arrangement has appeared sufficient to warrant a departure from strict order, in the instance of a physiological state which so frequently gives occasion to error in diagnosis.

this flattening gives place to slightly augmented fulness in the hypogastric region, which, from this time, gradually increases and steadily extends upwards. As the full term is approached, the enlargement becomes general. The anterior prominence of the abdomen is in all cases greater than the lateral, and more marked in multiparæ than in those pregnant for the first time. The lower part of the chest is less expanded, and the costal angles less increased, than in diseases which occasion a similar amount of general enlargement. There is little or no alteration in the form on varying the posture; and the flanks do not, as in ascites, bulge outwards, nor does the anterior prominence become flattened on the patient lying upon her back. Sometimes the form of the pregnant uterus may be obscurely traced through the abdominal parietes. In the last weeks of pregnancy, the enlargement of the abdomen is observed to extend to a less degree upwards than formerly, and the epigastric region to assume a less rounded and more flattened aspect. In the first months of pregnancy, the umbilicus may be observed to be more depressed than customary, this appearance being coincident with the flattening of the hypogastrium; but about the fourth or fifth month, it becomes lessened in depth, and, about the sixth, attains the general level of the abdominal surface; from this time it gradually protrudes. These changes are of later occurrence in multiparæ than in those pregnant for the first time; and, in rare instances among the former, little or no protrusion may occur at all, or the umbilicus may retain its customary appearance up to the full period of gestation. In the latter months, the fœtal movements may be visible, consisting in the sudden and abrupt elevation (17) of portions of the wall of the abdomen corresponding to the enlarged uterus; the body of the patient may be agitated by their violence, and they may sometimes be discerned even through her dress. The superficial veins of the abdomen are not uncommonly enlarged.

The circular *measurements* of the abdomen are enlarged from the time that the uterus attains an elevation above the pubic symphysis, and while they increase with the progress of gestation, the two sides remain symmetrical. The lower thoracic measurements, though increased in the latter periods, are not so to the extent that is observed in ascites and tympanites, or in connexion with many morbid tumours within the abdomen. The respiratory movements of the abdomen and chest have been measured in two cases by Dr. Sibson:* in both, the costal movements were not exaggerated; but the diaphragmatic descent diffused its effect over a more extended surface, and thus lessened the general results of the measurement.

199. *Palpation* of the abdomen externally, furnishes no physical indication of pregnancy, additional to that afforded by inspection, prior to the fourth month, when the *tumour* formed by the developed fundus of the uterus may be discovered by manual examination above the pubes. In order to detect it, however, it is, for the most part, essential to ensure a full relaxation of the abdominal muscles, and to select the moment of a full expiration for making the necessary pressure. There is then perceived, lying behind and above the pubic symphysis, and somewhat to one side of it (mostly the right side), a firm, even, and rounded tumour. From this time the size of the tumour increases, together with the visible enlargement of the abdomen, and its position in the cavity becomes more central. In the course of the fifth month, it reaches, at its highest point, about midway between the pubic symphysis and the umbilicus; and, by the time the sixth month is attained, may be perceived to have risen as high as the umbilicus itself. Dr. Ingleby is of opinion that an unusually large pelvis may favour an early rise of the uterus out of the pelvis; and relates a case in which, at the third month, the fundus reached to within an inch of the umbilicus.† In the progress of its increase the tumour

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* Med.-Chir. Trans., vol. xxxi., p. 392.

† Dublin Jour. of Med. Science, O. S. vol. vi., p. 335.

becomes ovate and loses in firmness, and sometimes in ready circumscription, in proportion as it gains in size. Its firmness, however, varies with numerous circumstances connected with the state of the wall of the organ and with that of its contents. In the course of the seventh month, the upper part of the tumour reaches some two or three inches above the umbilicus; and by about a month before labour—the latter part of the eighth calendar month of pregnancy—the fundus of the uterus is perceived to have attained nearly to the height of the ensiform cartilage. In women who have passed through one or more previous labours, the fundus must not be expected to rise so high as in the primiparæ, since the previous stretching which the abdominal parietes have undergone permits of its falling more or less forwards, and protruding the soft parietes anteriorly, in place of rising vertically towards the thorax. During the last three or four weeks of pregnancy the fundus is observed to occupy a lower level than it did towards the close of the eighth month.

The perception of the body and limbs of the fœtus and of their movements, is another sign of pregnancy furnished by external examination. In spare subjects, the parts of the child, separated by more yielding interspaces, may sometimes be traced with tolerable facility during the latter months, and the fœtal movements may, for the most part, be discovered at some period in almost every subject, on careful examination. In rare instances this sign has been wanting throughout the whole of gestation. In searching for it, some assistance may be obtained by selecting the time which the woman states as that at which she herself perceives the movements of the child, or by examining her in a posture different from that which she has been previously maintaining. The plan recommended by some, of rendering the hand cold before applying it to the abdomen, with a view of exciting the fœtal movements, is open to some objections, which, to my mind, have much force. Amongst them, I may mention the diminution of tactile sensibility, which it is most essential to maintain complete when the examination is made at the earlier periods; and the probability of inducing spasmodic muscular contractions, either of the abdominal or uterine parietes, which may simulate, more or less perfectly, the movements of the fœtus. There is no certainty as to the relative time at which the movements are first perceptible to the mother, and to the hand of the physician. Sometimes the mother perceives them before they are palpable to an external examination, and sometimes, perhaps less commonly, they are first discoverable by palpation. They are first discernible towards the end of the fourth or during the course of the fifth calendar month, as a trifling pat, throb or fluttering sensation. In the succeeding months the movements and the perception of the moving body become more definite and characteristic; an abrupt sharpish impulse is observed, or a solid body, which may sometimes be recognised by its form to be one of the limbs or joints of a fœtus, is felt to slide over the surface of the hand with more or less accompanying pressure. In the latter months—prior, at least, to the last few days of pregnancy—the movements are commonly active; but women vary in this respect, as well as the same woman in her different pregnancies; besides which, the sign may be influenced by disease affecting the fœtus, and is, of course, altogether destroyed by its death.

There is a third sign furnished by external palpation, which was suggested by Dr. Heming some years ago, and which is of value, because it is applicable in some instances where vaginal examination fails, from peculiarities of any kind, to furnish all its ordinary indications. I allude to the sign of abdominal "repercussion." The patient is placed upon the knees and elbows, and the shoulders being depressed to as low a level as possible, the hand of the observer is placed flat upon the lower part of the abdomen; sudden pressure is then made with the fingers, and the hand, being retained in its position, shortly perceives a sensation referable to the descent of the fœtus upon it.

200. *Examination by the vagina* is the only method by which physical evidence of pregnancy, at all worthy of reliance, can be obtained during the earliest months. The indications which it affords have reference to the condition of the os and cervix uteri, to the development of the body of the uterus, and to the contents of its cavity. In respect to the *cervix*, the first palpable change which occurs is observed very early in gestation, namely, during the first two months, and is clearly perceptible by the termination of the second. It consists in a softening and development of this portion of the uterus, which thus feels swollen and more elastic than in the unimpregnated state: as a result of the swelling involving the margins of the os uteri, that aperture appears to the fingers less like a transverse slit, and more oval in its form; and it is closed. During the course of the second month the os and cervix appear to lie at a lower level than customary, being more readily reached than usual by the tip of the finger, the os sometimes also pointing somewhat forwards, as in prolapsus uteri. This sign corresponds in point of time with the visible flattening above the pubes, both being attributable to the development of the organ prior to its rise out of the pelvis. At the end of the third, or in the course of the fourth month, the elevation of the uterus out of the pelvis, and the consequent inclination forwards of its fundus in correspondence with the axis of the pelvic inlet, occasions an altered position and direction of these parts. The os and cervix are less readily reached by the finger, and the former points backwards towards the upper part of the sacral hollow, so that, in order to touch it, the finger must pass over the anterior lip. By the time the middle period of gestation is attained, this position of the cervix is decided, and the cervix has become slightly diminished in consequence of the encroachment made upon its tissue by the expansion of the uterine cavity. All these characters of shortening of the cervix and elevation and posterior direction of the os, continue to become more marked up to the month or six weeks preceding delivery, when the cervix is perceived reduced

to the form of a soft ring, surrounding the situation of the os. During the last few weeks, even this trace of cervix disappears, and the little depression which is all that may remain to indicate the os uteri, is only discernible after passing the finger far backwards over the surface of the tumour which is found occupying the upper part of the pelvic cavity. In women who have borne several children, the cervix may not become so completely lost to the touch during the latter weeks of gestation, and in some cases very little shortening at all is to be observed. The soft smooth fulness of the cervix and regular form of the os, characteristic of the early months, may be obscured by irregularities which have resulted from injury sustained in former labours. The perfect closure of the os uteri, too, which, when present, is a valuable indication of pregnancy, may in such subjects be wanting. At an early period, the weight of the uterus appears increased. The developed *body* of the uterus is perceived by vaginal examination towards the end of the fourth or in the course of the fifth month, as a smooth, hard, rounded surface, continuous with the cervix, and lying between its anterior part and the pubic symphysis. This surface is more readily discovered as pregnancy progresses, becomes more convex and prominent, and, as the period of delivery approaches, descends to a lower position in the pelvis, and is the part first touched when the finger is introduced into the vagina. The presence of the fœtus is first perceived by the finger introduced into the vagina, by the sign known as "ballottement," or "repercussion." The most eligible posture in searching for this sign is the erect, but where any objection arises to the examination being made in this position, the woman may be placed upon her side, but with the trunk as much as possible raised from the horizontal. A hand being placed over the fundus of the uterus, for the purpose of exerting some counter-pressure and preventing the movement of the organ itself, a finger is placed upon the uterine tumour between the cervix and the pubic symphysis: on now making sudden pressure with the finger, something will be perceived to have risen from the part, and in a few seconds a solid body will be felt to drop gently upon it, and to rest upon the tip of the finger like a light ball, which can, by a similar manœuvre, be made repeatedly to rise and fall. When first ascertained, which will be perhaps about the sixth month, the weight of the falling body is very trifling, since it gives the idea of being but of little greater specific gravity than the liquid in which it floats; but as time advances, it feels heavier, the sign is more perfectly developed, and constitutes the most undeniable evidence of the presence of a fœtus. At length, the growth of the fœtus in size and its increase in weight interfere with the manipulations essential to elicit this sign, which then gives way to the more evident perception, during the last six or eight weeks, of the portion of the child which occupies the inferior segment of the uterus, and which is commonly known as the "presenting part."

201. The application of *percussion* to the diagnosis of pregnancy requires but few observations. A dull sound with sense of increased resistance is perceived, superseding the resonance of the intestines everywhere that the uterus lies in contact with the abdominal parietes; the dulness and resistance being perfect immediately above the pubes, and from that part extending without interruption upwards and laterally, in proportion to the period of gestation, but leaving the flanks resonant. It is bounded above by a curved line indicative of the form of the upper part of the tumour, and the limits and form of the dulness are unaffected by changes in posture. The upper limit of the dulness descends somewhat during the act of inspiration. The resistance is greatest where the solid parts of the child are in contact with the uterine wall.

202. *Auscultation* of the abdomen furnishes two classes of signs in pregnancy, one having reference to the uterus, the other to its contents. The placental origin of the *uterine sound* meets with few supporters in the present day. The facts in our possession appear to show either that it has its origin entirely in

uterine circulation, or what is more probable, that several elements enter into its formation, among which are to be considered the effect of pressure exerted by the enlarged uterus upon the iliac vessels, and, as M. Cazeaux* has suggested, the conjoined existence of an altered condition of the blood. In character, the sound may be described as a blowing, rushing murmur, varying, however, in its tone even during the same examination, of variable duration, synchronous in its rhythm with that of the maternal pulse, but unaccompanied by impulse or shock. It is first heard, for the most part, towards the end of the fourth calendar month, although in rare cases it is said by Dr. Kennedy to have been heard as early as the twelfth, eleventh, or even the tenth week.† When first heard, it is perceived over the supra-pubic region, and over all accessible parts of the uterine tumour: as gestation advances, it becomes for the most part localised, or at all events more intense, in certain situations; but it must be recollected, that there is no part of the fully developed uterine tumour over which auscultation may not detect it in one subject or another. The murmur is most frequently discovered in the inguinal region of one or both sides; it is often more intense on one side than the other, and in some cases it has been displaced from one side to the other by turning the patient from her position on the right side to one upon the left, or *vice versâ*. From its seat of greatest intensity it mostly extends, with diminished loudness, upwards and anteriorly towards the umbilicus, and along the sides of the uterine tumour. In few cases has it been heard at the fundus alone. Its locality or seat of greatest intensity bears no relation to the position of the placenta, and it has occasionally been destroyed by placing the patient prone, supported by the hands and knees. Although synchronous in rhythm with the maternal pulse, it bears no necessary relation to it in respect of force, often being feeble when the maternal heart is acting strongly; it sometimes varies in intensity even over the same spot, and becomes inaudible for variable periods, requiring frequent and repeated examinations to detect its existence. When first audible, its intensity is feeble; but the sound, at first heard with difficulty, and not certainly distinguished from sounds arising from other causes, commonly becomes, in the progress of pregnancy, too evident to escape the least practised ear. Its presence is no evidence of the life of the fœtus, nor is its absence evidence of its death.

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* Archives Générales, 4me. ser., t. xxii., p. 336.

† Observations on Obstetric Auscultation, p. 82.

There are three sounds which take their origin in the fœtus. The chief of them results from the *pulsations of the fœtal heart.* These are first audible, for the most part, about the end of the fifth month, in rare instances earlier, requiring, however, at this early period, perfect silence to be maintained in the apartment, and the most concentrated attention; while the patient should be placed at such an elevation, and in such a posture, that the observer may prolong his examination without fatigue or a sense of constraint. They are rarely wanting in the latter half of pregnancy. The pulsations are represented by a series of rapid, muffled, ticking sounds, which, when counted, amount to 120 or 150 in the minute, and have no relation in point of rapidity with the maternal pulse, not being affected at all by acceleration or retardation of the latter. The usual situation in which the pulsations are heard, is a little below the umbilicus, and mostly to the left of the median line; but they may be discovered in other situations, which are said by Dupaul to vary with the presentation of the fœtus. If not discovered on prolonged and careful examination in the accustomed locality, other parts of the uterine tumour should be explored. Much patience is often requisite; the inquiry should be conducted very leisurely, and, after prolonged exploration, the sounds may possibly be heard in the very spot auscultated some minutes before without success. When necessary for the establishment of the diagnosis, the failure of the observer in detecting the fœtal pulsations at a first examination should only be a ground for repeating the search; and frequent examinations should be made, in various positions and with various modifications, before their absence should be positively pronounced. When discovered, they are not only a certain and unquestionable sign of the presence of a fœtus, but also of its life. The extent of surface over which they may be heard, and their intensity, vary with circumstances which must be noticed. The age of the fœtus is one of these, and another lies in the variations in its vital activity, the sounds being stronger in proportion to the period of pregnancy and the strength of the fœtus. Where much liquor amnii is present, the fœtal chest lies at a considerable distance from the uterine and abdominal walls, and the sounds are difficult of detection. Deep pressure with the stethoscope is then necessary, in order to approximate the ear sufficiently to the fœtal heart, or the fœtus must be brought near to the wall by placing the patient in the erect posture or upon the hands and knees. On the other hand, where little liquor amnii is present, or after its expulsion in labour, the sounds are unusually evident; but what they have gained in clearness, they have lost in extent, being audible only over a small or very limited space. Where there is an excess of liquor amnii, the diminution of intensity is somewhat compensated by increase in extent. Unusual thickening of the parietes also, from any cause, necessarily interferes with the perception of so delicate a sound.

A sound, produced by the *movements of the fœtus* within the uterus, is said to be audible shortly before the pulsations of the fœtal heart, and also before the movements can be discovered by palpation. At first this sound is very obscure, and imparts the idea of some body moving beneath the stethoscope. At a later period, the sound is accompanied by a shock or elevation of the ear of the observer, giving the impression of the uterine parietes being struck by some part of the fœtus. The prolonged absence of this sound, as of that of the fœtal heart, is to be taken as a sign of the death of the fœtus.

A murmur arising in the funis, and called by its discoverer, Dr. Kennedy,* the "funic souffle," is occasionally met with; it is weaker and shorter than the uterine murmur, and corresponds in its rhythm with that of the fœtal heart. It probably results from some compression to which the funis is subjected in passing between some prominent part of the child and the anterior wall of the uterus. Under similar circumstances, the *pulsation of the funis* corresponding with that of the fœtal heart, can be perceived: either may exist separately, or the two may be discovered at a short distance from one another. The pulsation may, by moderate pressure, be converted into the murmur. Where the wall of the abdomen and uterus have been thin, the cord has been distinguished by the hand, and felt to roll under the finger; in such a case, the pulsation may be perceived by the hand as well as by the ear, and may be rendered indistinct or arrested by the exercise of moderate or strong pressure on the fœtal side of the hand or stethoscope.

The detrusion which the thoracic organs undergo in pregnancy by the elevation of the diaphragm is very trifling; and consequently the several signs which indicate it show that the lower limits of the heart and lungs are but little raised above the normal position, certainly less so than in ascites, or in large ovarian tumour.

203. *Displacements of the uterus* may accompany pregnancy. Anteversion or anterior obliquity may occur when there is great relaxation of the anterior parietes, especially with great spinal or pelvic distortion. The fundus, in this case, may project the abdominal parietes so much forwards, as almost to overhang the symphysis pubis; and, on palpation, the long axis may be observed to be directed from behind forwards. The os uteri is situated unusually high up, and backwards towards the promontory of the sacrum. *Retroversion* of the pregnant uterus is indicated by similar signs to those which are observed when this form of displacement affects the unimpregnated womb (192); the tumour between the rectum and vagina being

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* Observations on Obstetric Auscultation, p. 121.

larger in proportion to the increased size of the organ. *Lateral obliquity*, to a slight degree, is of natural occurrence as the uterus commences to rise out of the pelvis; but in some cases it occurs to such an extent as to give rise to fulness and a hard round tumour near the iliac region, somewhat moveable, but presenting, in other respects, the character of uterine enlargement.

204. When *ascites is conjoined with pregnancy*, a modification of the signs of both conditions is observed. If the pregnancy be advanced, the general abdominal enlargement is much greater than in uncomplicated *ascites* (166); the signs indicating the elevation of the diaphragm are more marked, the lower aperture of the thorax is more dilated, and, consequently, the costal angles are greater, and there may be unequal fulness of the two sides in the upper abdominal regions. There is little if any change in the form of the abdomen on altering the position of the patient from the erect to the recumbent. Fluctuation may be less evident in the lower part of the abdomen than in simple ascites, but is perceived clearly in the upper regions of the cavity, sometimes most perfectly on the right, sometimes on the left side. The percussion sound in the umbilical region is dull, if the ascites be considerable, and the pregnancy advanced; and, if the uterus have risen to this level, pressure will fail to elicit any intestinal resonance. Several of the *signs of pregnancy* are also obscured. In addition to the greater enlargement of the abdomen, and the defective respiratory movement of the abdominal wall, which are superadded by the ascites, all that may be palpable of the enlarged womb may be a solid body, against which the fingers impinge on deep sudden pressure; the form, outline, and consistence of the tumour not being discoverable, or the former only in occasional instances. At the same time the layer of liquid throws an obstacle in the way of determining the existence of pregnancy by the perception of the fœtal movements, or the pulsations of the fœtal heart. When conjoined with dropsy of the amnion, however, as is not unfrequent, the

uterine murmur may still be apparent. In the very difficult cases which thus often arise, the observer is frequently thrown for his physical diagnosis upon the indications which are furnished by examination through the vagina. In a case recorded by Dr. Kennedy,* even this failed, the uterine murmur alone remaining to assist the diagnosis.

205. In *dropsy of the amnion*, the uterus is perceived above the pubes, both by the production of visible fulness and on palpation, earlier than is customary, and the increase of the abdominal enlargement is more rapid than in ordinary pregnancy. Although the abdomen is larger than the period of pregnancy will account for, the form and peculiarities of the abdominal enlargement are maintained. On palpation, however, the uterus feels unusually tense, but the tumour it forms is smooth and even upon the surface. The limbs and movements of the child are not to be detected through the parietes; and although the uterine murmur is unaffected, the fœtal heart is with difficulty heard, or is not at all perceptible, even with the aids already alluded to. Fluctuation, sometimes perfect, at other times more or less obscure and deep-seated, is perceptible over its whole surface, and is unaffected by alterations in posture. It does not extend beyond the limits of the felt tumour, or beyond the limits of its dulness on percussion. It may not only be perceived on external examination, but may also be felt by the finger placed upon the lower segment of the uterus in the vagina, on imparting an impulse to the abdominal portion of the tumour. The form of the uterine tumour, as traced out by percussion, may either be that natural to pregnancy, or may be more globular than is customary. On vaginal examination, the inferior segment of the uterus is felt to be much expanded, the cervix possibly more shortened than can be accounted for by the period of pregnancy, and the "ballottement" is commonly unusually free.

206. *Great distension of the bladder may accompany advanced pregnancy*, and form an oblong fluctuating tumour in front of

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* Op. cit., p. 84.

the lower part of the uterus above the pubes. When the bladder has extended upwards and has been flattened in front of the uterus, the complication has been mistaken for ascites. The circumscription of the fluctuating surface, its not being affected by changes of posture, and the effect of catheterism distinguish it from that disease. When the distended bladder cannot rise above the pubes, it may so distend the pelvis as to impede both examination and delivery. Its characters in this situation have already been alluded to (184). If labour have commenced, the tumour is found to become tense during each uterine contraction, unless urine should escape from the meatus.

207. When the fœtus dies at an early period, and the ovum becomes fleshy, forming one of the varieties of "*mole*," all the signs which indicate the presence of a fœtus are necessarily wanting. The increase of the abdominal enlargement and tumour is much more rapid than in pregnancy. The uterus is perceived to contain a substance of tolerable consistence, and "ballottement" is not discoverable.

Extra-uterine Pregnancy.

208. Of all the forms of extra-uterine pregnancy, the ventral, where the ovum lies and developes itself in the peritoneal sac, is that which most commonly exhibits physical signs sufficiently marked for the recognition of the disease. In the other forms, where the ovum is developed in the ovary, or in the Fallopian tube, death commonly occurs at an early period, from rupture and hæmorrhage into the peritoneum; and it is unusual for the fœtus to acquire a sufficient size to be discoverable by physical examination prior to the occurrence of the fatal accident alluded to.

209. In *ventral pregnancy* when advanced sufficiently to be brought under the notice of the practitioner, there is observed on *inspection*, enlargement of the abdomen, partial or general, according to the duration of the disease. In consequence of this, together with the simultaneous occurrence of some of the

physiological phenomena accompanying that state, pregnancy is commonly suspected; but from peculiarities in its signs a suspicion often crosses the mind of the patient and her friends that there is something unusual in its character. The abdominal enlargement does not possess the regular uniform shape of that from pregnancy within the uterus—a fact which derives its explanation from the uncertainty of the position which the ovum may occupy in the peritoneal sac. Wherever it may chance to be localised, the corresponding part of the abdomen presents a special enlargement, sometimes of a remarkably abrupt character, while the remaining part of the abdomen may be full from being occupied by the intestines more or less distended with flatus. The result of this is, that, wherever the chief seat of enlargement may be, the entire abdomen mostly acquires an irregular and unsymmetrical form. The seat of the special enlargement varies with the position of the fœtus, but for the most part it is observed in some part of the lower segment of the abdomen. In almost all cases where it crosses the median line, it is more marked upon one side of the abdomen than upon the other. It may present itself at the hypogastrium, in the umbilical region, or even as high up as the epigastrium. The abdominal enlargement may reach higher than that of natural pregnancy, while there is deficient fulness above the pubes. In some cases the enlargement is neither irregular nor unsymmetrical, but still its form differs from that of natural pregnancy. One of these alterations of form has been just referred to, and another consists in the abdomen being most prominent in the central region, from which part the enlargement subsides regularly in every direction. When first apparent it may be confined to one side of the median line. The rapidity with which it increases is often greater than that of natural pregnancy, the abdomen at six months being as large as at the full term of ordinary gestation. When the epigastric region is occupied there is no sinking of the part, as in natural pregnancy, as the full period is approached. After the natural period of gestation has elapsed, and the fœtus has been dead some few months, the abdominal enlargement undergoes a change; the prominence is mostly lessened and is found to have assumed a lower position. When ascites accompanies ventral pregnancy, it has the effect of rendering the form of the abdomen more symmetrical, and the supra-pubic region as full as in normal pregnancy. The appearance of the umbilicus is as uncertain as in natural pregnancy, and in some instances it has been found absolutely retracted. The fœtal movements are sometimes visible.

210. On *palpation*, the natural and symmetrical form and resistance of the smooth oval pregnant uterus are wanting, and in the place of them a tumour is discovered in the situation of the principal abdominal fulness. At an advanced period it is as large as a fœtus at the full time of pregnancy, but it is smaller at earlier periods. It commonly appears to lie immediately behind the abdominal parietes, its long diameter being transverse. Its form is mostly irregular or indefinite, and its consistence and the resistance it offers to pressure are not uniform over all parts. It is mostly nodulated with irregular and variously shaped elevations, some being rounded, others linear or ridge-like. In these elevations the observer can sometimes recognise clearly the several parts of a child, such as the head, elbows, knees, or heels, and he can even grasp them in a manner which natural pregnancy never permits. At other times the tumour when first shown to the medical man is rounded, and not nodulated, although still presenting a greater prominence upon one side than upon the other, and the limbs of the fœtus cannot be recognised. The parts of the abdomen occupied by the intestines, if prominent, are elastic and soft. During the life of the fœtus, the limbs may be felt to move spontaneously, and even the entire fœtus to change its position. When the tumour is situated high up across the epigastrium, the fœtal movements may be confined to this region, and the hand may, in such a case, be passed below the tumour backwards to the spine. When no spontaneous

movement is observable in the tumour, it is still for the most part moveable, becoming displaced on altering the posture of the patient from one side to the other, or under the hand of the observer. In a case lately recorded, the head of the fœtus was distinguished below the ensiform cartilage; it receded on the application of pressure, and by keeping the hand upon the spot the fœtus was felt to make a complete turn in the abdomen, the head passing into the right iliac region, and the extremities rising into the epigastrium. After the occurrence of false labour and the death of the fœtus, all spontaneous movements in the tumour cease, and nothing but the history of their occurrence remains to guide the practitioner in his diagnosis. After a time the parts of the tumour become more compressed, the limbs and other portions of the child, at an earlier period recognisable, are no longer to be distinguished, and the tumour altogether becomes smaller and of a more regular and uniform shape. At the same time it sinks to a lower level in the abdomen than it occupied at first, and often assumes a more median position. When originally situated at the lower part of the abdomen it often appears to sink more or less into the cavity of the pelvis. If the fœtus remains for any time in the abdomen after its death, the tumour may undergo a process of calcification, when it appears to acquire an increase of solidity and weight. In other cases it becomes the nucleus of a peritoneal abscess, the signs of which have already been described (175).

The signs of upward detrusion of the diaphragm vary in degree with the position of the tumour; being more marked than in natural pregnancy, when the fœtus is developed in the upper abdominal regions.

211. *Vaginal examination* furnishes signs which, though they may not always be absolutely distinctive of this form of tumour, yet are often of value in forming a diagnosis. In some cases at an early period, the tumour occasioned by the fœtus is felt through the posterior wall of the vagina, at some level, in the recto-vaginal pouch, or it may be discovered here during

its stage of contraction. When, during a consecutive normal pregnancy, the tumour has occupied some part of the abdomen, it may after labour be discovered in this situation. The tumour thus detected in the pelvis may be the only indication of the disease; but where abdominal tumour is conjoined, its continuity with the pelvic tumour is determined by the transmission of impulse from one to the other, and perhaps also, by movement of the one producing movement of the other. The pelvic tumour may be undistinguishable by its shape and surface from an ovarian enlargement, but in other cases it presents to the finger the irregular feel of a fœtus, or parts of its body and limbs may be recognised by their form. Sometimes the head of the fœtus alone descends into the recto-vaginal pouch, when on vaginal examination it may be perceived unusually low for a natural head presentation, and yet covered by a substance apparently as thick as the parietes of the uterus. In order to distinguish this from natural pregnancy, the vaginal palpation may require to be aided by the introduction of a portion of the hand of the observer, so as to enable him to trace the course pursued by the anterior wall of the vagina, and the relation which the tumour bears above and anteriorly to the parietes of the canal. The position of the uterus varies with that of the fœtal tumour: when the latter is so high as not to press in any way upon the organ, its position is normal. When it lies low, there may be some prolapsus (189), and if the tumour press upon the posterior part of the fundus of the organ, it may become anteverted, the signs of this displacement (193) being evident on examination by the vagina. In this case the position of the os and cervix is such as, with the signs manifested on abdominal examination, to simulate pregnancy; in such a case the use of the uterine sound for assistance in the diagnosis would, of course, be quite inadmissible. When the tumour occupies any portion of the pelvis, other displacements of the uterus are presented. It may thus be displaced laterally, or the cervix may be flattened forwards against the pubic bones, not always, however, in the median line, or may, by elevation of the uterus, be rendered difficult of access, or even be carried out of reach of the finger. In such a case as this, extra-uterine pregnancy has been mistaken for retroversion of the uterus (192); but it is to be recollected that retroversion is a form of displacement which may be conjoined with extra-uterine pregnancy. In the early months the os uteri is commonly closed, as in normal pregnancy, and the cervix may undergo the development which marks this state; at later periods these signs disappear, and the absence of shortening of the cervix, and of the closure of the os uteri, give rise to a suspicion that the pregnancy is of unnatural character. The uterus and tumour are in most cases found to possess independent mobility, the uterus not being affected by movement of the tumour, and being itself capable of movement without impressing movement upon the tumour. Sometimes, however, on pushing upwards a moveable uterus, the abdominal tumour may also be raised; but the absence of development of the inferior segment of the uterus will commonly obviate any error which might arise from this circumstance. Of course, if adhesion have taken place between the tumour and the uterus, the signs of independent movement will not be observed.

212. On *percussion*, dulness is discoverable over the seat of the abdominal tumour, accompanied by a sense of resistance, which is either uniform over its whole surface or varied in different parts. Should the tumour lie immediately below the liver, its dulness may be continuous with the dulness of that organ.

It is not constantly that a sound of any kind is perceptible on *auscultation* over the tumour, but when it is so situated as to press upon the large vessels of the abdomen, a blowing murmur may be audible, often loud and extended over a considerable space. The sounds of the fœtal heart, of course, are only perceptible so long as the child is living, and even then are not always to be heard: much depends upon the position of the fœtus, and, when they are heard, it is mostly over a very limited space and at very uncertain times. The locality at which they are heard is sometimes much higher in the abdomen than ever occurs in healthy pregnancy—a fact in itself sufficient to determine that the fœtus is not included in its natural receptacle.

213. *Ovarian* and *tubal pregnancy*, it has been observed, are not commonly discovered by physical examination before they prove fatal to the patient by rupture and hæmorrhage. In rare instances, however, this accident is deferred till the third or fourth month of gestation, or even later; and then a palpable tumour elevating the abdominal wall may become perceptible, always situated on one side of the median line, in one or other of the iliac regions, mostly the right, and not reaching beyond the median line until it has acquired some considerable increase in size. Its form is more oval and elongated than that of an ovarian cyst, which may arise in the same situation. The fundus and body of the uterus may by displacement form a second tumour, perceptible on the other side of the median line. The tumour from ovarian pregnancy may be felt on *vaginal examination* behind the posterior wall of the canal, or occupying entirely the recto-vaginal pouch. It sometimes presents to the touch, either through the vagina or rectum, such irregularities as correspond to the parts of a fœtus; but this sign may be absent, while a sense of fluctuation may be perceived in consequence of the collection of pus or other liquid in the cyst, and, as in the more common form of ovarian enlargement, an impulse given to the abdominal tumour may be perceived by the finger in the vagina. The tumour is mostly sufficiently moveable to satisfy the observer that it is not adherent to the pelvic parietes. The uterus may be displaced in the same manner as in ovarian dropsy. When pressing on the iliac vessels, there may be a murmur audible over the abdominal tumour with each arterial pulsation.

Retention of the Menses.

214. An accumulation of the menstrual fluid, with the resulting distension of the uterus and Fallopian tubes, may occur

either in consequence of obliteration of the canal of the vagina, or from closure of the os uteri. When the retention has been protracted, and several monthly periods have elapsed, some amount of fulness or prominence begins to be observed above the pubes, or towards one or other of the iliac regions, the upper part of the abdomen appearing comparatively flattened. The bladder should be evacuated, prior to examination by the hand, and then *palpation* discovers a tumour which may either lie behind the pubes in the middle line, or incline towards one of the iliac regions. It is undefined below where it appears to dip into the pelvis; but above it is circumscribed, and in this direction may occasionally extend as high as to the level of the umbilicus. Its form is rounded when small, and when the Fallopian tubes are not engaged in the distension; but when these are implicated, there may be two other tumours at its upper part—one on each side—moveable separately from the uterus, but yet influenced by movements impressed upon the central tumour. In other cases, the tumour caused by the Fallopian tube is continuous with that of the uterus, without the intervention of a groove or other indication of anatomical difference. Only one of these lateral tumours may be perceived lying above and behind Poupart's ligament. The tumour feels solid when small, but, when large, varies in its consistence as well as in the readiness with which fluctuation may be perceived in it. In most cases it is capable of movement, both laterally and in an upward direction, although not undergoing spontaneous change of position during alteration in the posture of the patient. The capability of lateral movement is more commonly absent than that of elevation,—the latter being most obstructed by distension of both of the Fallopian tubes. The parts of the tumour which come into contact with the abdominal wall are dull upon *percussion*, with less resistance than in solid tumours; and *auscultation* discovers none of the audible signs of pregnancy.

On *examination by the rectum*, if no anteversion be present, the tumour of the distended uterus is palpable, and its mass is perceived to be continuous, by continuity of impulse, and on elevation by the finger, with the tumour above the pubes.

When the retention results from closure of the os uteri, *examination by the vagina* also aids the diagnosis. In some cases the cervix is lost to the touch, as a result of the same injuries that occasioned the closure of the os uteri. When anteversion is present, the closed os uteri is directed backwards, as in pregnancy. A fluctuating tumour is perceived, either anterior or posterior to the cervix, according as anteversion is present or absent. The surface of the tumour is smooth and even, and its firmness varies in different instances. In a recorded case,* it was felt, when touched, to harden itself by contraction of its tissue, as in the pains of labour. The cervix may be lowered or elongated, or there may be some anteflexion (196), or some lateral obliquity (194) of the uterus exhibited. The uterus may, as above stated, be in most cases raised by pressure of the finger, when its weight is perceived to be increased, and, on the other hand, the cervix may be felt to descend on exerting pressure on the abdominal tumour.

Hydatids of the Uterus.

215. The abdominal enlargement, in the cases of this disease which have been observed, resembles that of pregnancy. The *palpable* tumour also occupies the same situation, is capable of perfect definition, is somewhat moveable laterally, but is more globular in outline than that of the normally pregnant uterus; besides which, its size is altogether greater than the duration of a supposed pregnancy is capable of accounting for. It may have a hard solid feel, or it may be soft and obscurely fluctuating. The tumour, wherever it is in contact with the abdominal wall, is dull upon percussion, the dulness being limited by a distinct and regular outline. On *examination by the vagina,* the body of the uterus is felt enlarged and heavier than usual, and the cervix is shortened; the os uteri is mostly open, at any rate at the

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* Archives Générales, 4me Ser., t. xvii., p. 437.

advanced period at which the examination is generally made; but in other cases,* perhaps at an earlier period, it is closed. On introducing the finger through the os uteri, a softish substance may be perceived occupying the cavity of the organ. Of course, the absence of all the signs which indicate the presence of a fœtus materially assists the diagnosis.

Dropsy of the Uterus or Hydrometra.

216. Serous or seropurulent-looking fluid occasionally collects so abundantly in the cavity of the uterus as to distend that organ considerably, and to produce abdominal enlargement, and other signs, which may give rise to a suspicion either of pregnancy, with or without dropsy of the amnion, or of some other disease of the uterus or abdominal organs. The *enlargement* of the abdomen is similar to that in pregnancy; but the rapidity of its increase is sometimes so great as clearly to distinguish the two states. Before using *palpation*, it is highly important, as in exploring other diseases, that the bladder should be emptied by catheterism; since, in a case recorded by Dr. A. T. Thomson,† that receptacle was stretched and displaced, and extended in front of the uterus to within an inch of the umbilicus,—an occurrence which could not fail to complicate the physical signs of the uterine disease. The tumour recognised by palpation occupies the lower part of the abdomen, the hypogastric and iliac regions, rising upwards without interruption to a variable height, but commonly not so high as that of pregnancy at the full term, although even this has been known to occur within a brief space of time. The common form of the tumour is said to be that of the pregnant uterus; but this is open to exception, since it has been found of irregular form, hard and prominent upon one side, but elastic and flattened upon the other. Fluctuation confined to the tumour, and unaltered in position or

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* See cases by Dr. Hislop. Edinburgh Monthly Journal, vol. x., pp. 327, 328.

† Med. Chir. Trans., vol. xiii., p. 170.

extent by change of posture, is occasionally very distinct, especially when perceived by the finger upon the lower segment of the uterus in the vagina; but mostly it is obscure, and may even be absent altogether. By *percussion*, the dulness elicited presents the ovoid form of the uterus, and is unaltered by changing the posture of the patient. The resistance perceived during percussion is less than in solid tumours of the organ, and uniform over the surface, unless disease in some part of the abdominal or uterine wall be conjoined. On *vaginal examination*, the lower segment of the uterus is felt to be enlarged, and to occupy a considerable portion of the pelvis, the whole organ being depressed and increased in weight. The cervix uteri is of natural length and the os mostly open, the obstruction existing in the canal of the cervix. Of course there is no "ballottement" to be obtained, and it need not be said that the sounds of the fœtal heart are not discoverable, although, prior to asserting this to be the case, the sign should be most carefully and repeatedly sought for. In a case recorded by Dr. Ingleby,* the signs of this affection were somewhat modified. The fundus of the uterus was distended into a sac containing a thickish fluid, while the inferior part of the organ had undergone fibrous degeneration. The signs it gave rise to were palpable tumour to the left of the umbilicus and lying on a line with it, projecting forwards, and firmer in some parts of it than in others. There was no fluctuation perceptible. A crawling movement was observed over every part of it, but not accompanied by any sudden impulse. On vaginal examination, the characters of the os and cervix uteri were scarcely changed; but a hard tumour was perceived, of the size of a child's head, at the superior part of the cervix.

Gas in the Uterus, or Physometra.

217. Although my experience confirms that of numerous other observers, that vaginal discharges of gas are not uncommon in

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* Dublin Journal of Medical Science, O. S., vol. vi., 356.

married females, I have never met with any accumulation of it in the cavity of the uterus, and very much doubt whether, in the occurrence I have alluded to, the gas comes from the uterus at all. Still, there is evidence enough to show that tympanites of the uterus is no fabulous disease, and that there are physical phenomena which should lead to the idea of its presence in individuals under observation. In extensive physometra, the abdomen is enlarged, the enlargement simulating that of pregnancy, sometimes occurring as gradually as in that state, but in other cases with much greater rapidity. On *palpation*, ovoid hypogastric non-fluctuating tumour is discoverable, of great elasticity, mostly extending only a few inches above the pubes, but sometimes as high as the navel, or even reaching the upper regions of the abdomen. On *percussion*, uniform resonance is elicited, which extends over all parts of the tumour, and is unaffected by alterations in the posture of the patient. On *vaginal examination*, the lower segment of the uterus is felt to be dilated and to be elastic to the touch; and the uterus, though large, is manifestly light, and very easily elevated by the pressure of the finger. The os uteri is closed, and it has occasionally happened that, in the manipulation to ascertain this point, the obstructing cause has been removed, and the tumour has subsided with escape of the gas.

Congestion and Hypertrophy of the Uterus.

218. Prolonged congestion of the uterus is pretty constantly accompanied by some amount of hypertrophy, and the physical signs of the two states are practically so conjoined, that it is difficult to separate them systematically. Hypertrophy, however, is not solely a result of congestion of the uterus, but may occur as a sequel of pregnancy, or as an accompaniment of tumours in the wall or in the cavity of the organ, in which last case its signs are intermixed with those of the tumours themselves.

Congestion and hypertrophy, when moderate in amount, produce a *visible* fulness above the pubes; when of smaller amount, this may not be discoverable, the signs being limited to those ascertained by exploration through the vagina or rectum. The form of the uterus may be discoverable on *palpation*, in a tumour situated in the hypogastric region, either in the median line or slightly on one side of it, which, in some instances, reaches as high as to the umbilicus. The tumour is hard and even, being similar to that of the pregnant uterus in the early months. At first, indeed, the tenderness above the pubes may be such as to occasion merely resistance to the pressure of the hand; the discovery of defined tumour not being made until the tenderness has abated. On *percussion*, the tumour is dull, and when it is very large, a murmur, accompanied by shock, may be perceived on *auscultation*, being produced by the pressure exerted upon the large vessels posterior to it. The increased size of the uterus is readily perceived on *examination by the rectum*, especially when the posterior wall is the part principally affected. When the congestion or hypertrophy affect chiefly the anterior wall, they are most readily detected by *vaginal examination*. When the cervix of the uterus is involved, it is felt to be harder, more rounded, thicker, and often also longer than customary, and the os uteri is open. There may be prolapsus, or when one side of the parietes is chiefly affected, its weight may occasion the corresponding form of inclination or obliquity, and thus the signs of retroversion, anteversion, or lateral version of the organ may be conjoined to those of enlargement. The size of the organ is ascertained by conjoined palpation by the hand externally, and by the finger in the vagina or rectum. At the same time, the enlarged uterus is perceived to be moveable, and its weight to be increased. If the uterine sound be introduced, its extremity is perceived to pass into the centre of the tumour, taking the direction of the inclination which the uterus has assumed, and the cavity of the organ is perceived to be elongated. The absence of the diagnostic acoustic signs of pregnancy may be ascertained by repeated examination.

The signs of *metritis* are similar to those of congestion. Of course, with any suspicion of its existence, it would be culpable to introduce the uterine sound.

Fibrous Tumour of the Uterus.

219. Fibrous tumours form either in the wall of the uterus, beneath its peritoneal covering, or beneath the mucous membrane lining the organ. In all cases, more or less, hypertrophy of the uterus is conjoined, but this adjunct is most remarkable when the tumour is submucous and projects into the cavity.

Fibrous tumour developed in the wall of the organ is not distinguishable by any physical signs from simple hypertrophy, unless it cause some projection upon either the exterior or interior of the organ, when its signs approximate to those of sub-peritoneal or sub-mucous tumours.

220. *Sub-peritoneal fibrous tumours* chiefly occur on the posterior part of the uterus. The *visible* enlargement of the abdomen of course varies with the conjoined bulk of the hypertrophied uterus and fibrous tumour. It may be so great as to simulate ascites or ovarian dropsy, and according to the position of the uterus and the disposition of the tumours, the enlargement is symmetrical or otherwise. It undergoes no change on altering the posture of the patient. When solid fibrous tumour occurs on the anterior surface of the hypertrophied uterus, the general enlargement may, at the corresponding spot, have a conical projection or special prominence superadded to it. When it is large, or situated posteriorly or laterally, and presses seriously upon the abdominal vessels, enlarged veins may be observed upon the surface of the abdomen. On *palpation*, tumour is discoverable originating in the lower region of the abdomen, mostly occupying the hypogastric region, and extending upwards and laterally to a variable degree. It may be discovered lying on one side of the hypogastrium, towards one of the iliac regions. Its form is rounded or irregular, and its surface may be even or nodulated; the latter is especially the case when several

tumours exist upon an enlarged uterus. Its hardness is very great, and it wants the elasticity of the pregnant uterus. It is generally fixed, or only very slightly moveable; but if attached by a long pedicle, it may be raised or moved about from one side of the abdomen to the other. It never occupies such a position as to allow of its perfect definition below, or of the hand to be passed back below it to the promontory of the sacrum.

221. On *examination by the rectum*, the uterine tumour may be felt pressing upon its anterior wall, and when the uterus is retroverted, the altered position of the fundus becomes evident at the same time. When the tumour is situated on the posterior surface of the uterus, it may only be capable of detection by this method of exploration. *Vaginal examination* gives results which vary with the effect of the disease upon the position of the uterus. When the uterus is raised out of the pelvis, the signs of upward displacement are observed; and if, at the same time, the tumour giving rise to this elevation should be situated laterally, the uterus may present also the signs of lateral obliquity and displacement, sometimes to a very remarkable extent. Such displacements are accompanied by elongation of the vagina, and commonly also by similar displacements of the bladder. When much hypertrophy is conjoined, the cervix often undergoes a remarkable alteration; it becomes shortened, or is altogether lost to the touch; the vagina is felt to terminate in a funnel-shaped manner, the os uteri appearing as a rounded aperture at the extremity of that canal. When the posterior wall is the seat of disease, the os uteri may be discovered lying forwards behind the pubic symphysis, or it may be carried so much upwards and forwards as to be completely withdrawn from the reach of the finger. In such a case, the uterine tumour may be felt through the posterior wall of the vagina, occupying more or less of the pelvic cavity. It is always hard, its form globular or rounded, and its surface nodulated or even. The pelvic tumour is mostly fixed, or only slightly moveable, and is felt to be continuous with that perceived above the pubes. When the tumour in the abdomen is raised,

its connexion with the uterus is exhibited by the corresponding movement being imparted to the cervix as felt by the finger in the vagina. In some instances of fibrous tumour the uterus is not elevated at all, but the weight of the organ may occasion it to assume a lower position than natural, which may be confirmed during its subsequent development. The uterine sound can mostly be introduced with facility; but it sometimes happens that the cervix of the uterus itself is elongated and narrowed, and at last its canal becomes obliterated in some part of its extent, and obstructs the passage of the instrument. When it enters the uterine cavity, the latter is mostly found to be elongated, sometimes to a very great extent. The instrument appears to enter into the mass of the tumour, or to pass in some direction towards it posteriorly or laterally; it may pass anteriorly, but this is uncommon. When the sound is within the organ, movements impressed upon the abdominal tumour produce corresponding movements of the handle of the instrument, and if any movement of the uterus can be effected by the sound, which is not always possible, it is accompanied by movement of the tumour. The cavity may present an angular deflection in addition to its lateral inclination. It less commonly happens that the cavity is of natural length, or shortened.

222. On *percussion*, the abdominal tumour presents dulness, with great sense of resistance, over all parts of its surface; it is bounded by a line, regular or irregular according to the form of the enlargement, and is unaffected by alteration in the posture of the patient. On *auscultation*, an aortic and iliac murmur may be perceived, accompanied by shock, but unless pregnancy be conjoined, there will be no sound resembling that of the fœtal heart.

223. Large fibrous tumours of the uterus sometimes *soften*. When this occurs, very obscure fluctuation may be perceptible over a limited space, and even when this is absent, the tumour will feel soft at some parts and hard at others. Such a state of the tumour may terminate in perforation of

the sac of the softened mass, and effusion of its contents into the peritoneal cavity. When this accident happens, or *ascites* chances to be developed, the palpable signs of abdominal tumour are lost, except to sudden deep pressure, the enlargement becomes symmetrical, and the signs of ascites (166) or *chronic peritonitis* (177) become prominent.

224. *Pediculation of the fibrous tumour*, especially if the pedicle be long, alters its signs. The tumour still occupies the hypogastric and iliac regions, but may, if not adherent, be so moveable as to be capable of being pushed from one side of the abdomen to the other; and it may be capable of being raised by the hands as one mass. Such a tumour lying above the uterus may depress both that organ and the bladder, retroverting the former, and altering the direction of the urethra backwards, a sound introduced into the bladder being capable of being swept over the lower surface of the pelvic tumour from side to side. The long pedicle may also permit of the abdominal tumour being raised by the hands without a corresponding movement being impressed upon the uterus, or felt through the vagina, this organ being capable of independent movement as fully as if it were of ovarian origin.* In a case related by Mr. Bulley,† a pediculated tumour of this kind appears to have undergone a process of calcification, and to have formed a firm, hard, bony mass. During life it was perceived as an abruptly-defined and hardened mass in the right iliac region, extending across the umbilicus, and appeared to arise from an enlarged and indurated liver.

225. When *fibrous tumour is superadded to pregnancy*, there may be no greater abdominal enlargement than the pregnancy alone will account for; but the symmetrical hardness and form of the tumour may be wanting, and the fœtal movements may be not discoverable at all by the observer, or only perceived very feebly. When *pregnancy follows upon fibrous tumour*, a second

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* See Mr. Atlee's case. American Jour. of Med. Sciences, vol. xxxv., p. 309.

† Prov. Med. and Surg. Jour., vol. iii., p. 385.

tumour may develope itself on the side opposite to that which the fibrous tumour occupies, its surface being smooth and even, like that of the pregnant uterus, and its consistence less hard than the previous tumour. At the same time, the form of the abdomen becomes more symmetrical than it might have been when the fibrous disease was uncomplicated. Whenever there is the least suspicion of pregnancy, the utmost patience must be exercised, and most repeated examinations must be made in searching for the sounds of the fœtal heart before the absence of this state is declared; nor even when this sign cannot be detected, must the presence of pregnancy be denied, until every indication of it has received its full consideration, and has been allowed its full degree of weight. The perception of the fœtal movements and the sound of the fœtal heart are most seriously obstructed when the fibrous masses are developed in the anterior and lateral parts of the uterus; and even the evidence derivable from vaginal examination may be withdrawn by the obstruction of the canal, and the occupation of the pelvis, by the fibrous mass. When the fibrous tumour is small, it may be apparent to the hand only when the uterus is so far enlarged by pregnancy as to be felt above the pubes.

226. When the fibrous tumour is *submucous*, it projects into the cavity of the uterus, carrying the mucous membrane before it. When large, it constitutes the *fibrous polypus*. In such cases, the uterine wall becomes exceedingly hypertrophied, and the abdominal signs of the disease are those which indicate this condition (218). The abdominal tumour is harder and less elastic than that of pregnancy, and may be nodulated. In such cases, also, the os uteri is open, and the mass of the tumour may either be perceived protruding through it, or may be felt on further introduction of the finger within the uterine cavity. The cervix is commonly shortened, or altogether lost, and the os uteri may be merely bounded by a thinned and flattened edge. When the tumour projects, it is felt to be constricted at the spot at which it passes through the os uteri, swelling out again as it

is traced into the cavity. The mass in the vagina is smooth and hard to the touch. When the tumour has not projected, and the os uteri admits the finger, a smooth, hard, rounded and broad projection is perceived in the cavity, upon which the cervix may be freely moved, showing that they are not connected. Both at this time, and at an earlier period, when the os cannot be entered, the lower and anterior part of the uterus is perceived to be enlarged, the weight of the entire organ is increased, and its position may be lower than customary. The cervix uteri at this period is wanting in the indications of pregnancy,—a state for which this stage of fibrous polypus might readily be mistaken.

Cancer of the Body of the Uterus.

227. It is well known that, in by far the majority of instances of cancer affecting the body of the uterus, the disease has originated in the cervix, in which situation it is readily detected by vaginal examination with the finger and speculum. In other less common instances, however, it takes its origin in the body or fundus of the organ. It prefers, as its locality, the posterior wall of the organ, and is accompanied by hypertrophy of the parietes. There is also a development of fibrous tumours in addition to the cancerous growth. Fungous growths from the cancerous tissue sometimes project into the cavity, and distend it. It thus appears that the disease, when situated in the body or fundus alone, is often undistinguishable from fibrous tumours, with which it may completely agree in its physical signs. When soft cancer fills the cavity of the organ, and simulates fibrous polypus, the uterus, as examined by the rectum, appears large, lobulated, and elastic; the growth is more rapid than that of fibrous tumours, and the tissue of the intra-uterine mass more easily broken down. In either case, the uterus may be fixed: in cancer by the consecutive implication of neighbouring tissues, and in polypus by *adhesion*.

Soft Polypus of the Uterus.

228. The abdominal enlargement in this form of disease, which, like fibrous polypus, is accompanied by hypertrophy of the uterus, resembles that of pregnancy or uterine hypertrophy; and the palpable tumour is mostly of the form and consistence of that which these states occasion. This regularity of form, as ascertained by palpation and percussion, is not of constant occurrence; on the contrary, the form may be irregular, and an idea of the co-existence of several tumours may be imparted by palpation. The character and form of the tumour may alter in the progress of the disease, as in a case recorded by Dr. Clarke.* It may either arise near the middle line, or towards one side of the hypogastrium. On vaginal examination, the uterus is found enlarged and increased in weight; but the cervix is wanting in the characters which it presents in pregnancy: the os is unusually open, and the polypus may be felt protruding from it and occupying the vagina; being soft and spongy to the feel. The increased size of the uterus may raise the os so high as to render it difficult to be reached by the finger. The lips of the os uteri, when the polypus has protruded, or just prior to this stage, are thinned, and the cervix is lost to the touch, while the lower segment of the uterus is perceived to have undergone unusual development. At the time that the protrusion occurs, the tumour may be extending high up in the cavity of the abdomen, or, on the other hand, the abdominal tumour may disappear as the polypus protrudes. The mass which projects through the os uteri into the vagina is soft, narrowed at the situation of the os, and pyriform, or sometimes irregular in shape.

Displacement of the Ovary.

229. Displacement of the ovary *upwards* is, like elevation of the uterus, a common result of great increase in the bulk of the

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* Essays on Puerperal Fever, etc.—*Sydenham Society*, p. 539.

organ, which almost necessitates its rise out of the pelvis into the larger space afforded above the pelvic brim. The signs of this elevation are conjoined with those of the accompanying enlargement. Displacement *downwards* occurs when the enlargement is less extensive, and when the organ is either prevented from rising by the previous occupation of the abdomen by a tumour, or when it is only so much enlarged as to descend, from its increased weight, to a lower level than customary. Under these circumstances, the ovary which in the healthy state cannot be perceived by the finger in the vagina, and only occasionally through the rectum, becomes easily touched through the wall of either canal, since it occupies a lower position than natural in the rectovaginal pouch. By examining with a finger introduced simultaneously into each canal, the organ can be included between the two, and then imparts the idea of a small convex body, like an enlarged gland, which is moveable, unless, as sometimes happens, it has become adherent in its new situation.

Inflammation and Abscess of the Ovary.

230. It has already been stated that inflammation and abscess of the ovary frequently accompany inflammation of the broad ligaments of the uterus, and the state known as pelvic inflammation and abscess; and when this occurs, the signs of the ovarian disease are merged into those which have been before enumerated (187). When ovaritis, however, occurs as an independent disease, it is commonly first discovered by vaginal examination, the enlarged organ presenting the downward form of displacement, and becoming evident to the touch between the vagina and the rectum. When suppuration has taken place, it may feel larger and softer than before, and adherent either to the vagina or the rectum, whose walls cannot then be made to slide over the surface of the tumour. When the abscess is large, it extends upwards, and produces fulness and resistance and subsequently smooth rounded tumour in the iliac or on one

side of the hypogastric region, upon which the abdominal parietes can be freely moved, dull upon percussion, and unaffected by free evacuation of the bowels. When large, it may so occupy the pelvis as to displace the bladder and uterus upwards and forwards, so that a catheter introduced into the meatus has to pass up close behind the pubic symphysis, while the os tincæ is elevated almost beyond reach. In such a case fluctuation may be perceived by the finger on the pelvic tumour, when an impulse is communicated to the tumour observed above the pelvic brim. When it has attained any great size, however, local peritonitis and inflammation of the broad ligaments commonly complicate its signs.

Encysted Disease of the Ovary—Ovarian Dropsy.

231. *Inspection* affords no indication of ovarian encysted disease, until the ovary has increased to such a bulk as to rise above the pelvic brim. The first sign which it affords is a fulness in the lower region of the abdomen, for the most part on one side of the hypogastrium, or in one of the iliac regions. In some cases this slightly lateral position of the commencing enlargement is not noticed, or it may be obscured by flatulent fulness of the intestines. The rapidity with which the enlargement increases varies considerably. In some instances, having reached the abdomen, the enlargement remains stationary for months, or even years, and then suddenly increases, and rapidly attains its full size. In other instances the progress is steady and gradual, or more or less rapid from the first. As it increases, the enlargement mostly becomes more symmetrical; but, even when it is great, one side of the abdomen commonly presents somewhat greater prominence than the other. The more prominent side of the abdomen is, in by far the majority of cases, that to which the diseased ovary originally belonged; but it sometimes happens that the opposite side to this is the more prominent, from that side of the tumour being the heavier,

and falling over, as the tumour grows, not only to the median line, but even beyond it. The enlargement is general when the disease has attained its fullest development. When the whole or the greater part of the tumour is constituted by one large sac, the enlargement is even and rounded, no local prominence, except that due to the want of symmetry before noticed, being observable. The umbilicus becomes prominent, and, when ascites is conjoined, the posterior wall of the vagina may be protruded beyond the vulva, the protrusion palpably containing fluid, and expanding when the patient coughs. The effect of posture on the enlargement is deserving of notice. When the tumour is full, and the abdominal wall firm, the enlargement projects forwards in the erect posture, the flanks being not proportionally distended. On placing the patient on the back, there is the same appearance exhibited,—no flattening occurring anteriorly, and no bulging in the flanks, such as would have been observed in ascites. When the parietes are loose, however, and the cyst is flaccid, as after tapping, the enlargement may appear to be moveable. When the patient sits in a chair, for example, the abdominal enlargement may hang down over the pubes, so that the umbilicus may be on a level with the knees, but it resumes a more central position when she is placed upon her back. In like manner, the whole flaccid abdominal enlargement may swing over from one side to the other, in accordance with that on which the patient lies. In the multilocular form of the disease, although the same general enlargement is noticed, the symmetry of the two sides is often less perfect than has been described, or there may be irregularly placed special elevations exhibited upon its outline. In this form, also, and much less commonly in the unilocular variety, some enlargement of the superficial veins is observed reaching from the lower part of the abdomen to the chest, either upon both sides, or on that alone which corresponds with the diseased ovary. In the former case the veins on the side of the diseased ovary will be more enlarged than those on the opposite.

232. *Measurement* affords indications somewhat similar to

those in ascites (166). The circular measurements of the abdomen and of the lower part of the thorax are increased; but the latter, in most cases, not so greatly as in ascites producing the same amount of abdominal enlargement. The abdominal measurement sometimes presents the natural symmetrical equality of the two sides; but in other cases the one exceeds the other to the extent of an inch or more. The relative proportion of the distance between the umbilicus and the pubic symphysis on the one hand, and the lower end of the sternum on the other, varies with the size of the tumour, as well as with its adhesions to other parts. When the tumour is non-adherent, and occupies the greater part of the abdominal cavity, the relative proportion of these measurements is little if at all interfered with, although, of course, both are individually augmented. But at an earlier period, when the enlargement occurs entirely, or almost entirely, below the level of the navel, the distance of that fold from the pubic symphysis is proportionally as well as actually greater than natural. When free from adhesion and only of moderate size, these tumours do not modify the respiratory movements of the abdomen; but if they be large, the abdominal expansion in the inspiratory acts is lessened in extent.

233. *Palpation* should be performed after the use of catheterism, and after free evacuation of the bowels. It commonly affords the earliest available information of the presence of ovarian dropsy. So long as the tumour is confined to the pelvis, no application may be made to a practitioner for the relief of any symptoms which might lead to an examination of the pelvis by the touch, although this is the way in which ovarian tumours are sometimes first detected. In many cases the abdominal tumour is discovered accidentally, even when it has acquired considerable size, during an abdominal exploration with some other object. When first apparent, the tumour is commonly situated in one of the iliac regions, extending forwards into the hypogastrium, and upwards to a variable height into the abdomen. It is somewhat moveable, unless adherent or

impacted in the pelvis, and the abdominal wall can be freely moved over its surface. It is mostly smooth upon the surface, circumscribed, of rounded or somewhat lobulated form, and tolerably hard to the touch, especially if it be of the multilocular variety: when small, fluctuation is not commonly discoverable in it. *When the tumour has acquired a large size*, sufficient to produce general abdominal enlargement, the boundaries of the enlarged ovary are less readily definable; but in some instances they remain as definable as when it is small. The upper border is most easily made out, the lower part of the tumour being lost in the pelvis. It generally lies in the centre of the abdomen, mostly predominating a little on one side, which is generally that on which the disease originated. When its mass inclines towards the opposite side to that of the diseased organ, the peculiarity is due to a deposit of fibrous matters, etc., rendering that side of the tumour the heavier, and carrying it over by gravitation, as it rises in the abdomen. It sometimes occupies a position in the abdomen similar to that of an enlarged spleen or liver, or it simulates a splenic tumour (117) by extending obliquely from the right iliac region to the left hypochondrium. The side of the tumour which reaches nearest to the flank is with greatest difficulty definable by the touch. Much depends in feeling out the limits of a cyst upon the density of its substance and the consistence of its contents. It is mostly, if not adherent, more or less moveable; its mobility is sometimes considerable, the tumour being capable of being pushed quite over to the opposite side of the abdomen. When so large as to occupy the abdomen almost entirely, its bulk alone interferes with its being moved. Pressure upon the surface of the tumour gives to the hand the idea of considerable resistance. When it is *unilocular*, this resistance is equable over the whole surface, extending from the pubic symphysis upwards to the highest limit of the tumour, and as far towards the flanks as the latter extends. In one or other of the flanks, or in both, the elasticity of the intestines is perceptible. In other cases the resistance to pressure is not thus equable over the tumour. In *multilocular* encysted tumour, where the cells are large, or where the whole of its upper and middle portion is occupied by one large cyst, while the smaller ones are confined to its lower part, the resistance over the greater part of the enlargement may be as equable as in unilocular dropsy,—the part of the abdomen above the pubes corresponding with the aggregation of small cysts, presenting greater resistance than the parts above. Where the cells are altogether smaller and numerous, the form of the tumour may be less regular and its surface lobulated, the lobulations being softer and more yielding than those of fibrous tumours of the uterus.

234. When the *wall of the cyst is thickened* irregularly with small hard cysts, or by fibrous substance, the palpation of the tumour or abdominal enlargement, not by sudden or violent pressure, but by gentle pressure gradually and regularly applied, gives evidence of their presence. These thickenings are felt of all sizes and forms, are generally prominent in the centre, and thin off towards their circumference. Their form, situation, and size are sometimes such as to simulate enlargement of the liver (88) or spleen (117).

235. Although, when first perceived, these tumours either do not fluctuate at all, or very imperfectly and obscurely, yet when they have arrived at the size we are considering, the absence of this sign is quite exceptional. The fluctuation does not extend beyond the limits of the tumour; the flanks being free from it, even on the patient assuming such a position as to favour gravitation towards them, except, indeed, ascites be conjoined, or in those cases where the cyst is so extensive as to occupy these regions of the abdomen. When one large cyst lies in contact with the abdominal parietes, the perfection of the fluctuation is determined by the tenseness of the abdominal wall, and of the cyst, as well as by the fluidity of the matter the latter contains. The more albuminous and thick is the liquid of the cyst, for the most part the more obscure and deep-seated the fluctuation

appears, and the larger are the waves; but although this is the rule, the reverse may nevertheless occur; and a cyst containing a thin fluid may give to the hand a large-sized wave, while a fine and superficial fluctuation may be imparted by a highly albuminous fluid. Even firm gelatinous matter in a cyst may give rise to a fluctuation which the most practised hand cannot distinguish from that of a thin liquid. The fluctuation of a *multilocular cyst* is rarely so perfect as of one that is unilocular, except where the abdominal part of the tumour is formed by one large cyst, the smaller ones occupying its lower part. It is also less readily conducted from side to side of the tumour, being confined to portions of the cyst, and it is often less readily transmitted in one direction than in another. A tumour, however, consisting of a mass of small cysts, has been known to give rise to fluctuation as perfect and as readily conducted in various directions as when it is unilocular. Where there is considerable partial *thickening of the wall of the cyst*, it prevents or greatly interferes with the perception of fluctuation by the hand placed over it, although, by reversing the direction of the fluctuation, percussing the thickening and receiving the impulse where it was previously given, the fluctuation may be readily perceptible. When the thickening is not considerable, and especially if the thickened spot be adherent to the parietes, the sense of fluctuation is as readily perceptible as over other parts of the tumour. As in the case of other tumours lying over the large vessels of the abdomen, a pulsation transmitted from the aorta may occasionally be perceived by the hand placed upon the surface of the ovarian enlargement.

236. *Examination by the vagina* may, as before observed, reveal the presence of ovarian encysted tumour before any enlargement is manifested above the pubes; since, until the enlargement of the organ arrives at a certain size, it remains in that part of the cavity to which the ovary properly belongs. In this early stage it forms a tumour palpable through the posterior wall of the vagina, mostly lying somewhat to one side, smooth

or nodulated on the surface, hard or elastic to the feel, more or less moveable, and especially capable of elevation by strong pressure. If the tumour is at the same time to be felt above the brim of the pelvis, its continuity between the two hands is readily observed, and fluctuation may in some instances be perceived by the finger in the vagina, on imparting an impulse to the tumour in the abdomen. Examination *by the rectum* gives similar information respecting the seat, form, surface, and consistence of the tumour. On using a finger simultaneously in both canals, the situation of the mass between the rectum and vagina, and towards one side of the pelvis, is more accurately determined, and a better idea of its size may be attained than by examination through only one canal. As thus perceived, the pelvic tumour may be small, or it may fill the whole of the cavity, the passage of the finger being impeded, and the pelvic organs being displaced or compressed. When the tumour occupies the abdomen, and attains a considerable size, it may cease to be evident on examination by the vagina or rectum, or it may still be perceived occupying more or less of the pelvis; the latter is more commonly the case where there are more than one cyst constituting the tumour. In either case the vagina, uterus, and bladder, commonly undergo some change in their position. There may be complete prolapsus of the uterus (189) observed; but, for the most part, the vagina is elongated and narrowed, the cervix and os uteri are elevated—sometimes even out of reach of the finger, and carried forwards, and the bladder drawn upwards above the pubes, so that a catheter introduced into the meatus passes upwards and forwards close behind the symphysis. In other cases there is retroversion of the uterus (192). In some, the position of the vagina, uterus, and bladder is quite unaffected, but this is only when the ovarian tumour lies entirely in the abdomen, and its pedicle is sufficiently long. When the diagnosis is obscure, valuable information is gained by the use of the *uterine sound*. It does not appear to pass into the midst of the abdominal tumour, as in fibrous tumour of the uterus, but, unless the uterus be natural in its position prolapsed or retroverted, it passes either in front or to one side of it. The cavity of the organ is either natural in length, or extended; in the latter case the os uteri may either be higher, or lower and more forward than usual, the fundus being perceived by palpation above the pubes, or towards one side of the hypogastrium. By the same means the uterus and the abdominal tumour may be perceived to be moveable independently of each other. The uterus may be fixed with the sound while the tumour is moved; the uterus may be moved while the tumour is fixed by the hands; or the uterus may be moved in one direction by the sound, while the tumour is displaced in the opposite direction by the hands.

237. *Percussion* over the abdominal enlargement elicits a dull note, with a sense of resistance, from the pubes continuously over its most prominent part, and upwards, sometimes even to the ensiform cartilage and cartilages of the false ribs. Laterally, it extends as far as the tumour itself: the flanks are mostly resonant, but when the tumour is very large, one or even both of them may be dull. The outline of the dulness is abrupt, either regularly or irregularly curved, according to the shape of the cyst; its extent laterally and upwards are rarely quite symmetrical on the two sides, sometimes even very unsymmetrical. The dulness is uniform over the mass of the tumour, but the sense of resistance is greater at those points where the tumour has greater solidity, and less where the cyst is thin. Alteration in the posture of the patient does not affect the results of percussion; and the sound elicited in the central regions of the abdomen, as well as in the flanks, is the same when she is erect, or lying upon the back or upon either side. Pressing upon the dull part also while practising percussion, does not, as in ascites, elicit resonance at any depth from the surface. When the tumour is not adherent, the upper limit of the dulness descends to the extent of an inch or more during the inspiratory acts.

Two circumstances connected with percussion may obscure the diagnosis. One of these is the occurrence of a coil of intestine above the pubes, between the cyst and abdominal wall. The occurrence of intestine in front of an ovarian tumour is noticed by Piorry as well as by Dr. Walshe.* In a case which happened in my own practice, the tumour consisted of two cysts, connected at the pelvic brim by a narrower portion, across which, and between it and the wall of the abdomen, lay a coil of small intestine. It gave rise to a resonance above the pubes, while there was dulness over all the rest of the abdominal enlargement continuous with that of the liver; a cyst was perceived in the pelvis on vaginal examination. The other cause of obscurity I allude to is the occurrence of a communication between the cavity of the cyst and the intestine, by which the contents of the former are evacuated, and their place taken by gas. This may give rise to resonance in the central regions of the abdomen, similar to that exhibited in enlargement from ascites.

238. *Auscultation* affords little more than negative information, namely, the absence of the sounds of the intestines from their accustomed site, and over all the extent of dulness, and their limitation to the resonant portions of the abdomen. In some cases a murmur becomes apparent in the iliac regions, from pressure upon the iliac arteries; or a murmur, accompanied by pulsation, may be heard over the course of one of the epigastric arteries, which may be arrested by firm pressure upon the vessel below the stethoscope.

239. Displacement of the diaphragm upwards is indicated by the customary signs, and, although less early in its occurrence, and less marked than in some other diseases producing an equal amount of general abdominal enlargement, yet in some cases it is extreme, and as great as in any disease which has been hitherto noticed.

240. For the most part, only one ovary is affected with encysted disease to such an extent as to give rise to physical signs of its presence. Sometimes, however, *both are affected*

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* Nature and Treatment of Cancer, p. 436.

more or less extensively. Both of the enlarged ovaries may then lie in the cavity of the abdomen, and two tumours may be palpable lying side by side, separated above by a notch. In such a case, one of them is usually smaller than the other. Both should be carefully examined with a view to ascertain the presence of any of the palpable or acoustic signs of pregnancy. The existence of two palpable cysts in the abdomen, however, is no proof of *both* ovaries being affected, unless each one be moveable independently of the other, since the same sensation may be imparted to the hand by a single ovarian tumour presenting two or more cysts side by side in the abdomen. In other and more frequent instances, the disease in one ovary precedes that in the other by some considerable period of time, and has acquired a large size and occupied much of the abdomen, before the other ovary has commenced enlarging. The second tumour cannot then rise out of the pelvis, but grows within the cavity and fills it completely, compressing, according to its size, all the organs of the pelvis, and preventing the entrance of the finger into the vagina. It may be distinguished from a single tumour with a pelvic prolongation, by undergoing no change of position when the abdominal tumour is elevated by the hands.

241. Sometimes *a large cyst ruptures* and effuses its contents into the peritoneal cavity. When this occurs, the signs which mark the circumscription of the tumour become lost, and are replaced by those of peritoneal effusion. Among the alterations which take place in the physical signs, may be enumerated the occurrence of a greater uniformity and symmetry in the abdominal enlargement, and a less degree of anterior prominence and lateral flattening; a bulging out of the flanks, and flattening of the anterior parietes on assuming a dorsal decumbency; a loss of circumscription of the tumour both by the hand and by percussion; a more clear idea of displacing liquid on pressing the abdomen; uniform dulness from the pubes to a line of level across the abdomen, the latter varying, as in peritoneal effusion, with the posture of the patient; and gravitation of the dulness to

those portions of the cavity which may be rendered dependent. If any part of the tumour remain unruptured at the lower part of the abdomen, it may still be palpable at the hypogastrium, or on examination by the vagina or the rectum. Some variety in the signs may possibly arise, from the nature of the effused matter. When it is gelatinous or colloid, for example, it may accumulate in the pelvis, or in one of the flanks, and its dulness in the latter region may not be capable of displacement by alteration in the posture of the patient.

242. The *evacuation of the contents* of an encysted ovarian dropsy *by paracentesis* not only affects the physical indications of its extent, but aids in the diagnosis of its unilocular or multilocular character. If it be unilocular and not adherent, all parts of the cyst capable of being felt are perceived after the operation to have contracted regularly and uniformly within smaller limits, and if the tumour be perceptible *per vaginam*, it is felt to be flaccid or empty. The percussion dulness also is less extensive in every direction, and the flanks become more extensively resonant, especially on the side opposite to that to which the diseased ovary belongs. The rounded enlargement of the abdomen becomes less prominent, and in some cases the flaccid parietes and cyst exhibit a tendency to fall over to that side which the posture of the patient renders dependent. When the tumour consists of more than one cyst, that only which the instrument enters is evacuated, and the result is various, according to the extent and position of the remaining portion of the tumour. There may thus be a general diminution to a certain amount in the enlargement and rotundity of the abdomen; the tumour is still perceived by the hand, but of smaller size than before, while parts formerly prominent are now depressed, and the prominence is situated in a different portion of the mass to that in which it was formerly observed; or again, a tumour of previously regular form may, from partial evacuation, become after tapping irregular, the portions not emptied still remaining, while those which have been evacuated have collapsed. When the cavity

of the tumour felt *per vaginam* does not communicate with that of the abdominal portion, it remains unaltered, except, perhaps, in its readiness of elevation by the pressure of the finger. When thickenings are present in the wall of the cyst, their extent and other characters are better determined after tapping than before the operation has been performed.

243. *Adhesion of the ovarian tumour* may take place to any part of the wall, or to abdominal or pelvic organs with which it may at any time lie in contact. It is sometimes of great practical importance to ascertain its existence, especially in cases where the operation of extirpation has been proposed, and other circumstances are favourable to the prospect of its success. I shall therefore endeavour to point out the indications by which this condition is to be diagnosed, so far as our present means of physical exploration are applicable to the purpose. 1. Adhesion *to the soft parietes of the abdomen and false pelvis.* *a.* Adhesion to the abdominal parietes is preceded by peritonitis and the effusion of lymph, and hence the first sign of its occurrence is the perception, by palpation or auscultation, of the friction phenomena described on a former occasion (172). I have never met with them in the unilocular form of the disease, but I have reason to believe that if sought for, they would not rarely be discovered over the denser portions of multilocular tumours, where, especially after the operation of tapping, they have always occurred to myself. Of course, no further judgment can be formed from this sign as to the nature of the adhesion, than that, probably, for a short time after it has been perceived, the adhesion of which it indicates the formation is not of remarkable firmness. *b.* A second sign consists in the impossibility of gathering up the abdominal wall by the fingers, or of moving it over the surface of the tumour opposite an adherent spot. There are difficulties in the application of this test; one of them lies in the fact, that when the tumour is very large, the tension of the parietes may be so great as to prevent their being gathered up and moved over the surface of the cyst, although perfectly

and completely free from adhesion to it; and another lies in the fact that when the integuments are thick and flaccid, it is difficult to be certain that the supposed movement of the wall upon the cyst is not merely the sliding of the integument upon the deeper layers of the parietes themselves. *c.* A third sign lies in the immobility of the tumour within the abdomen. This is conclusive so far as it concerns the part actually perceived to move. Unless, however, the part of the cyst believed to move under the pressure of the hand, can be recognised by some characters which may distinguish it, such, for instance, as by forming the margin of the tumour, or by presenting some elevation upon its surface, and unless the displacement be such as that a part perceived beneath one spot in the parietes becomes perceptible beneath another part of the parietes (although these spots be only a short distance apart), much doubt must hang over the reality of the tumour being moved at all. When the tumour is very large, this test is inapplicable to those parts of it which lie much below the level of the umbilicus; but if, when the tumour is not large, it can be moved in a mass from its position on one side towards the median line, or towards the opposite side of the abdomen, the evidence is satisfactory that there is no adhesion to the false pelvis, or to the abdominal parietes in its neighbourhood. *d.* A fourth sign is the non-descent of the upper limit of the percussion dulness of the tumour during deep inspiration. This sign indicates either considerable and firm adhesion over much of the central and lower regions of the abdomen, or of firm but perhaps less extensive adhesion of the upper part of the tumour. When an unadherent cyst is very large and rises unusually high, the descent of the percussion dulness may be much curtailed, but appears never to be completely lost or abolished. In connection with this sign may be mentioned an unusual diminution, considering the size of the tumour, of the abdominal expansion during inspiration, as determined by the "chest measurer." *e.* A fifth sign is a very marked lateral position of the tumour and abdominal prominence, when the former has arrived at such a size as, in most cases, to assume a central position in the abdomen; the other parts of the abdomen being at the same time resonant on percussion, and exhibiting other signs of the presence of subjacent intestines. When an ovarian tumour acquires a certain size, it never fails to fall over in obedience to the laws of gravitation, at any rate in some degree, towards the median line, unless it be prevented from doing so by adhesion to the parietes or false pelvis, or by the co-existence of some other abdominal tumour, as that of the pregnant uterus, etc. *f.* A sixth sign is derived from the results of examination after the performance of paracentesis. It has been observed that an unilocular tumour collapses after tapping equally in all directions, and when multilocular it still collapses, but unequally. When any part is adherent, however, it does not collapse with the rest of the tumour, but is still discoverable, by palpation and percussion, in the same place which it previously occupied. The dulness of the collapsed cyst, from this cause, assumes an irregular form: the shape of the tumour thus traced out being regulated by the situation and extent of the adhesion. I believe nothing but adhesion will furnish a sign similar to this; mere thickening of the wall of the cyst at such a place, or greater solidity of the tumour, though they might greatly limit the collapse of the part of the cyst occupied by them, does not so effectually and totally prevent it. *g.* A seventh sign I mention with more distrust, notwithstanding that in difficult cases it deserves to be taken into consideration. I allude to the vertical position of the umbilicus, and its relative distance from the pubes and bottom of the sternum. When the distance of the umbilicus from the pubes is greatly increased relatively to its distance from the lower end of the sternum, if at the same time the size of the tumour be great, and especially if it reaches to the epigastrium, extensive, close, and firm adhesions may be expected over that part which lies below the level of the navel. The contrary state, however, by no means indicates a freedom from adhesions. 2. Adhesion *to the cavity of the true pelvis* is not at all easy of determination. The only sign upon which reliance can be placed is the immobility of the tumour and the impossibility of raising it, as ascertained by examination through the vagina or rectum. This sign, however, may arise from other causes besides adhesion, among which may be mentioned the impaction of the tumour at the pelvic brim. Even tapping may not distinguish between these, inasmuch as the cyst occupying the pelvis may have no communication with that lying in the abdomen, and thus be unaffected by its evacuation. 3. Adhesion *to the uterus* will not only result in the elevation of that organ, with the ovary, out of the pelvis, but in the destruction of one of the diagnostic signs between ovarian and uterine tumour, namely, the independent mobility of the uterus and the tumour. The diagnosis between these two forms of disease, however, may generally be sufficiently established on other grounds, leaving the sign alluded to as diagnostic of the adhesion of the uterus to the ovarian tumour. 4. Adhesion *to the omentum and intestines* cannot at present be determined by physical examination at all.

244. When ovarian dropsy is *combined with ascites*, the signs of the peritoneal effusion (166), if it be considerable, obscure those of the ovarian dropsy. In cases where the effusion is trifling, the only difficulty it introduces into the diagnosis is the occurrence of dulness on percussion in the flanks, as in uncomplicated ascites, on rendering either of those regions dependent. When the effusion is great, the predominant signs are those of ascites, although the great anterior prominence of the abdomen, its large size, and the dulness of the umbilical region in the dorsal decumbency, should lead to further investigation. In some cases the abdominal tumour is altogether lost to the touch, but in others may still be felt on using sudden deep pressure, or on causing the fluid to gravitate from the part examined. Percussion with deep pressure in the umbilical region (if the ovarian tumour reaches thus high), still elicits a dull sound. The signs derived from examination through the vagina or rectum are unaffected by the effusion. After withdrawal of the ascitic fluid by

paracentesis, the presence and nature of the ovarian enlargement, its fluctuation, and the presence of adhesions may be ascertained with much accuracy.

245. There may be occasionally discovered, when this combination is present, *an additional sign of adhesion* of the ovarian enlargement to the parietes, if the adhesion be close and over some amount of space. When pressure is strongly made with the points of the fingers, upon any spot of the abdomen in ascites or simple ovarian dropsy, but a small area around the spot pressed upon undergoes depression; but when these diseases are combined, and adhesion is present in addition, pressure over the adherent spot may not only depress the spot immediately touched, but the surface of the parietes may be drawn back with it over an extended space, corresponding with the breadth of the adhesion. In order for this sign to be observed, however, there must be considerable ascites, and the tumour must be firm and resistant.

246. When ovarian disease *arises in the course of pregnancy*, or the tumour it occasions is so small as to allow of the uterus slipping up from its neighbourhood into the abdomen, no sign of the former is manifested by an abdominal exploration. When labour commences, however, an impediment to its progress is discovered in a tumour lying behind and rather to one side of the vagina. Its form and surface are as formerly described (236), and its mobility is such as sometimes to allow of its being pushed above the pelvic brim into the abdomen, and out of the way of the child's head. It may be elastic to the touch, becoming tense during each pain, or, even when containing a thin fluid, it may feel hard and bony, and be uninfluenced by the uterine contractions. In other instances, however, the ovarian enlargement has attained a considerable bulk when pregnancy sets in, and already forms an abdominal tumour, or appears in the abdomen along with the pregnant uterus, the two growing together. In such a case, the characters of the ovarian tumour distinguish it from the pregnant uterus or from fibrous enlargement of that organ; the chief difficulty lies in determining the presence or absence of the

pregnant state. The position of the os and cervix uteri affords no information; their other palpable characters, as influenced by pregnancy (200), being more worthy of reliance. On examining the abdomen, either two distinct tumours may be discovered, in which case a suspicion of the presence of pregnancy as the cause of one of them might arise, or only one may be discoverable, which exhibits on one side, either high up or low down, an unnatural degree of prominence. This prominence may either possess the characters of an ovarian tumour previously determined to be present, or it may be so much firmer, smoother, and less fluctuating, as to render it probable that it is of a different nature. When the suspicion of pregnancy occurs, no pains should be spared in seeking its diagnostic auscultatory indications, especially the sounds of the fœtal heart. When a tumour can be felt by the vagina, and two in the abdomen, some assistance may be afforded in judging which of the latter is ovarian and which uterine, by noticing which of them transmits an impulse to the finger placed upon the pelvic tumour.

Solid Ovarian Tumour.

247. Solid tumours of the ovary may be fibrous or malignant. Neither of these forms of disease commonly attains a bulk as great as is exhibited often by encysted tumour, but many of their other signs are similar to those presented by that kind of enlargement. *Fibrous tumour*, in rare instances, becomes so large as even to raise the diaphragm, and produce the signs of compression of the thoracic viscera. It is heavier than when the tumour contains fluid, and does not fluctuate. Even when very large, it is, unless adherent, quite moveable, being capable of being rolled upon its own axis, and passed to the side of the abdomen, or raised by the hands to the extent of an inch or more. When thus moveable, it occupies the centre of the abdomen, resting upon the pelvis. When adherent to one side, as to the iliac fossa, it retains a lateral position, and, in the course of its development, gives rise to very great deformity—the prominence affecting

the iliac region, flank and groin of the side to which it is adherent. The surface of a fibrous tumour may be smooth or tuberculated. When conjoined with ascites, it may be capable of being mistaken for ovarian dropsy, with thickening of some part of the wall of the cyst; the mobility of the solid mass, however, and the possibility of practising a kind of *ballottement* with it, together with the determination of ascites by its very evident characters (166) are sufficient, in careful hands, to obviate error. *Cancerous tumour* of the ovary grows more rapidly than ovarian dropsy; it does not fluctuate, except sometimes obscurely; is soft, elastic, or doughy if encephaloid, but hard if scirrhous, and its surface is more lobulated than tumour from encysted disease. Its feel is not always uniform, some parts being harder than others. Irregular contractile movements in the abdominal muscles over such a tumour have been mistaken for those of a living fœtus. Like other tumours in its situation, it may transmit a murmur from the large vessels of the abdomen.

DISEASES OF THE VESSELS OF THE ABDOMEN.

Nervous Abdominal Pulsation.

248. Visible and palpable pulsation often occurs, independently both of aneurism and of tumour over or beneath the great vessels, and is not only troublesome in itself, but commonly alarms the patient and his friends. It is most frequently seated in the epigastric region, but may extend downwards to the umbilicus, or even lower in the course of one of the iliac vessels. It may be trifling in intensity, or so severe as to agitate the body of the patient and the bed upon which he lies. It sometimes arises suddenly, and suddenly disappears, and may vary in intensity with the period of the day or under the influence of mental causes, or it may especially occur after meals. The pulsation is of a free bounding or smart and jerking character. On pressing down to the aorta on each side, the diameter of the vessel is perceived to be normal, and the lateral pulsation to be

of inconsiderable width, while the length of the pulsating part is remarkable. There is no tumour; but a great lumbar curve throwing forward an aorta in this condition, may, in a thin subject, simulate a tumour in the umbilical region, the pulsation being strongest at this spot, and gradually diminishing upwards in the course of the aorta. The existence of a great dorsal curvature in such a case may, on the principle of compensation, render probable the existence of a great anterior lumbar curve, and so throw light upon the case. The impulsive sound of the aorta is increased, but there is never any double shock like that which may distinguish an aneurism. A short whiffing murmur, not specially loud at any one point, may be audible along the course of the pulsation, and, like that of aneurism, though absent in the erect posture, may be developed by placing the patient upon his back. In other cases no murmur is audible in any posture.

Aneurism of the Abdominal Aorta.

249. When an aneurism of the abdominal aorta is small, or communicates with the artery posteriorly, no visible indication of its presence may be perceptible. When, however, it communicates anteriorly, and attains a larger size, it mostly occasions a prominent elevation above the surface of the parietes. A common position for the prominence is the epigastrium, extending towards the left side, or it may be observed in the umbilical region, the left hypochondrium, the left side of the abdomen, the left lumbar or even in the left iliac region. In other cases it produces a smooth prominent elevation of the epigastrium and both hypochondriac regions, simulating that from enlarged liver. Less commonly the prominence exhibits itself in the right hypochondrium, and still more rarely in the right side of the abdomen or iliac region. When prominence occurs in the lumbar region it has been mistaken for lumbar abscess, the similarity being increased by prominence also appearing at the groin. It is mostly, but not constantly, the seat of visible pulsation. When

the aneurismal tumour presses much upon the vena cava, the superficial veins of the abdomen may be enlarged. When the tumour is large, or is situated immediately beneath the diaphragm, it impedes its descent, and the movements of the abdomen during the inspiratory acts. In some cases the *measurement* of the left semi-circumference of the abdomen exceeds that of the right.

250. *Palpation* may discover fixed tumour in one of the situations above enumerated. It may be superficial, and discovered with facility, the abdominal wall being capable of free movement over it, or deep pressure may be required to arrive at it. When situated in the right iliac region, and forming an oval tumour with evident fluctuation in the course of the psoas muscle, it has been mistaken for abscess from caries of the vertebræ. This error may, in such a case, be confirmed by some prominence of the lower dorsal spines, the result of the backward pressure of the tumour upon the bodies of the vertebræ. The degree of circumscription of the tumour varies according to its depth and form, and the condition of the superjacent intestines as to flatulent distension. In all cases, a very imperfect idea is gained of the actual size of the tumour from the results of palpation; but it is perceived to exceed the breadth of the aorta. When the aneurism has originated from the posterior side of the aorta, palpable tumour is rarely perceptible. The tumour has been known to vary with the posture of the patient, disappearing on his turning upon his left side, but re-appearing on his lying upon the back.* The surface of the tumour is mostly smooth, and its form rounded or oval; but irregularity of surface may be simulated by fæcal matter in the bowels, etc. It is hard, but if force enough be employed, is generally perceived to have some amount of compressibility. It may occasionally be wholly incompressible. It is not safe, however, to employ much force in examining a tumour suspected to be aneurismal. In some cases the tumour attains a very large size, and may be perceived to occupy a large part of the general cavity of the abdomen.

* Stokes—Dublin Journal of Medical Science, N. S. vol. ii. p. 519.

When thus large, its margin is often ill-defined. When seated on the left side of the abdomen, it may be readily definable anteriorly, but with difficulty posteriorly. In this situation it has been mistaken for an enlarged spleen (117). A tumour in the right hypochondrium connected with aneurism may consist of the liver pushed forward by the aneurismal tumour behind it; and unless care be taken in the examination of the patient, the disease may be mistaken for one of the liver. For the most part the tumour pulsates, and when this is the case, the pulsation has a heaving and very forcible character, and occurs both in the vertical and lateral direction, the latter being perceived on grasping the sides of the tumour between the hands, or by forcing down the stethoscope to its side. The tumour and impulse may both be lost to the hand by the aneurism being bound down by the crura of the diaphragm. In a case related by Dr. Hope,* the lateral expansion and impulse were defective, and no murmur was heard, in consequence of extensive old adhesions of the pancreas on the left and in front of the tumour, and of the kidney on the right, which firmly bound it down, and limited its expansibility. It may vary with the posture of the patient, being most evident as he lies on his back, least on sitting up, or lying on the side. Pulsation may be completely absent, even in aneurisms of considerable size.

251. When the tumour is sufficiently superficial to be *percussed*, the sound elicited is dull, and may be continuous with the dulness of the liver, but is mostly separated from it by a resonant interval. When it is deeply seated, resonance alone may be obtained over its seat. On *auscultation*, the ear may perceive *shock* and *murmur*. The shock is mostly systolic (synchronous with the cardiac systole), but there may be a diastolic shock also, and when the latter is observed, it is pathognomonic of aneurism. Both may be accompanied by palpable thrill. The *murmur* accompanies the systole, and varies in its character; for the most part it is blowing, but sometimes rough and friction-like. It presents all

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* Diseases of the Heart, etc., 4th edition, p. 436.

degrees of intensity; in some cases it is loud, in others slight or scarcely audible, in others, again, altogether wanting. When tumour is perceived at the epigastrium, the murmur may not only be audible over it in front, but also posteriorly. In some cases it is only to be heard by the side of the spine. It may be audible at a time when no tumour is discoverable on palpation. In this case it may be expected that the aneurism communicates with the posterior aspect of the vessel. If heard beyond the tumour, it is more audible over the aorta below than above it, and, according to Dr. Walshe,* may be heard in the former situation when none is audible over the sac itself. An aneurismal tumour may give only a single dead impulse, and no murmur; but the latter may be developed in it by strong pressure with the stethoscope. Murmur may be absent in a pulsating aneurismal tumour in the epigastrium, both over the tumour itself, above it, and below it. Dr. Corrigan† has shown that, when a murmur is absent in the erect position, it may sometimes be developed by placing the patient on his back; and considers that the adoption of this practice may lead to the detection of an aneurism earlier than would otherwise occur. He explains it by the removal of hydrostatic pressure from the walls of the cyst permitting a more free passage of the blood into and out of the tumour. Dr. Hope relates a case‡ in which a superficial whiff restricted to a line crossing the summit of the tumour, and ceasing on firm depression of the stethoscope, was due to the mesenteric artery passing across it.

252. Aortic aneurism often terminates by *rupture and the effusion of blood behind the peritoneum*, raising this membrane, detruding towards the opposite side the kidney, spleen, stomach, etc., and raising the diaphragm upwards towards the chest. This effusion sometimes occurs suddenly, at other times by instalments: it is indicated by diffused enlargement, generally

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* On Diseases of the Lungs and Heart, p. 569.

† Dublin Journal of Medical Science, O. S., vol. ii., p. 375.

‡ Op. cit., p. 432.

affecting the left side of the abdomen, far more rarely the right; when extending high up, it bulges out the inferior third of the chest on the affected side. The bulged part exhibits irregular hardness and softness, and may present, when the blood is newly effused, a general heaving pulsation; but in other cases this is wanting. It is dull upon percussion. The murmur previously heard either disappears, is weakened in its intensity, or merely undergoes some change in its position.

Aneurism of the Cœliac Artery.

253. Aneurism of the cœliac artery gives rise, when sufficiently large, to palpable tumour either at the epigastrium or under the cartilages of the ribs on the left side, strongly pulsating; the pulsation has the general and forcible expansile character of an aneurism, and is accompanied or not by palpable thrill. The readiness of circumscription of the tumour varies; when distinctly perceived, it may be moveable and compressible. Pulsation however, without distinct tumour, a little below the ensiform cartilage, accompanied by thrill, may be the only palpable sign of the disease. The murmur varies in harshness and intensity, is heard over the seat of pulsation, and perhaps, diminishing in intensity, for a short distance also along the aorta below it.

Aneurism of the Superior Mesenteric Artery.

254. Aneurism of this artery may produce visible pulsation at the umbilical region. On palpation, it may present tumour, with aneurismal pulsation either at this region or in the epigastrium, circumscribed, globular, and of two to four inches diameter. The pulsation may be accompanied by thrill. The tumour is mostly moveable, the pulsation accompanying it when it is pushed aside. In a case recorded by Dr. Wilson,* the tumour was very evident as the patient lay on his back, projecting

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* Med. Chir. Trans., vol. xxiv., p. 221.

rather to the left of the epigastrium, moveable in every direction, but with the greatest readiness to the left side. When the patient turned to the left side, it fell at once under the ribs, and could no longer be felt. On turning to the right side, the tumour fell over to this side, and could be felt in front and to the right of the epigastrium. The pulsation may be increased after meals. Murmur in this tumour, as in every other aneurism, may vary in intensity, and may be audible upon and below the tumour. The occurrence of flatulent distension may give rise to an idea that the tumour is reduced in size.

Aneurism of the Renal Artery.

255. In the few records of aneurism of the renal artery which I have met with, the description given of its physical signs is very meagre. When it attains a large size, however, it appears[*] that it may produce considerable elevation, extending over all the left hypochondriac and lumbar regions. Like aneurism of the aorta, it may rupture behind the peritoneum. In a case of this kind quoted by Rayer,[†] the occurrence of this accident produced a sense of hardness over the right side of the abdomen, while the left side was soft; and on examination after death, there was found a large tumour occupying almost all the right side of the abdomen and driving the intestines to the left, produced by effusion of blood behind the peritoneum. This must also produce dulness on percussion over the corresponding surface of the abdomen, as when a similar accident occurs in aortic aneurism.

Aneurism of the External Iliac Artery.

256. From its producing abdominal tumour, a notice of this aneurism must not be omitted, although it is a disease belonging to the domain of surgery. When it first manifests itself, it

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[*] Case quoted by Rayer, Maladies des Reins, t. iii., p. 583.

[†] Ibid., p. 588.

produces circumscribed prominence in the inguinal region, both above and below Poupart's ligament, increasing often with rapidity, till it distends the whole iliac region, and extends into the hypogastrium and to the umbilical region. Palpation discovers that this prominence is the effect of a tumour originating in the groin, and extending subsequently so as to occupy the regions above mentioned. It is tense and elastic, but compressible by steady pressure, the blood returning into the sac after compression, with sensible thrill. Its surface is smooth and even, but it may present a furrow where it is crossed by Poupart's ligament. In a case recorded by Mr. Syme,* the surface of the tumour was nodulated irregularly, and this fact gave rise to the idea that it was not aneurism, but a malignant growth; the irregularity was occasioned by the glands of the groin lying in front of the aneurism. It possesses the general expansile pulsation of aneurism, but it may be altogether free both from pulsation and from thrill. It may, like other aneurisms, exhibit murmur, or this sign may be wanting or very indistinct.

Varicose Aneurism.

257. In very rare cases, varicose aneurism occurs between the abdominal *aorta and vena cava.* An instance of this is recorded by Mr. Syme,† in which the disease occurred just above the bifurcation of the aorta. The physical signs observed were throbbing at the epigastrium, with an incessant whizzing noise arising from that part, and much complained of by the patient and his friends. As he lay upon the back, the pulsation of a large tumour was perceived by the hand, not so strong as that of an ordinary aneurism, while the tumour itself was more compressible. Another case is recorded by Mr. Thurnam,‡ which occurred in the practice of Mr. Robinson, in which the only signs noted in reference to the abdomen were fulness and

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* Edinburgh Med. and Surg. Journ., vol. l., p. 373.

† Ibid., vol. xxxvi., p. 104.

‡ Med. Chir. Trans., vol. xxiii., p. 334.

indistinct fluctuation (from effusion), while the superficial veins became very large, tortuous, and purple. In another case, recorded by Mr. Thurnam (Mr. Woodhead's*), the only recorded sign was violent throbbing of the abdominal aorta in the umbilical region. In such cases as these, the murmur is a continuous one, rendered more intense during the periods of the heart's systole. A case of aneurismal communication is recorded by Mr. Adams, between the *right common iliac artery* and vein,† the only sign noted being the presence of tumour in the lower part of the abdomen on the right side, accompanied by a purring sensation imparted to the hand.

Occlusion and Obliteration of the Large Veins of the Abdomen.

258. Occlusion and obliteration of the large veins may occur either as a result of disease in the vessels themselves, or from compression by some tumour, cancerous or otherwise, external to them. When the *vena portæ* is affected alone, it is not commonly observed that the abdominal superficial veins are enlarged, but this occurs sometimes; ascites, however, is constantly present. When the *vena cava* is affected, a collateral circulation may be carried on entirely by means of the azygos and deeper abdominal veins. In other cases the superficial veins may assist, and then, becoming elongated, tortuous, and varicose, with an increase in their diameter sometimes to the size of a finger's breadth, form a network in front of the abdomen, extending from the groins to the thorax and axillæ, where they may be seen dipping inwards to join the system of the superior cava. In such cases, pressure with the finger will exhibit the circulation in these veins, passing in a direction from below upwards. The superficial veins of the lower extremities are also more or less enlarged and turgid. The venous enlargements

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* Med. Chir. Trans., vol. xxiii., p. 337.

† Dublin Journal, O. S., vol. xviii., p. 166.

of the abdomen are most remarkable when the vena cava and vena portæ are both occluded. Obliteration of one of the *iliac veins* may occasion enlargement of the superficial veins of the abdomen. In a recorded case,* in which the left iliac vein was obliterated by a cancerous tumour, the left hip is said to have been swollen, and covered with varicose veins, and a large vein was seen running from the left crural towards the umbilicus, where it turned round, and, descending on the other side, joined the right crural vein; its course was tortuous, and pressure upon it showed that the blood passed from left to right.

EXTRA-PERITONEAL DISEASES.

259. Although these are, perhaps, not strictly diseases of the abdomen, in the common sense of that phrase, yet they are so liable to be mistaken for them, that a brief notice appears desirable of such as are most likely to occasion error.

Fat in the Abdominal Wall.

The sub-cutaneous tissue of the abdominal wall may become so overloaded with fat, as to produce great abdominal enlargement, and even to give rise to the suspicion of pregnancy; which may be rendered otherwise probable by accompanying symptoms, and confirmed in the opinion of the observer by a sensation of irregular movements being perceived on application of the hand. In these cases the umbilicus is deepened, sometimes very considerably, the deposit of fat being most abundant immediately around that fold. The abdomen has a doughy feel, to which an augmentation of the fat between the layers of the peritoneal folds may contribute. The thickened parietes may, however, be diagnosed by pinching up the fat between the fingers, or by pressing backwards on each side with the hands, and making them meet behind the wall. The wall is dull upon superficial percussion; but strong percussion, according to the thickness of fat, elicits the customary resonance of the intestines. The absence of any signs of upward detrusion of the diaphragm may assist in the diagnosis.

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* Lancet, 1828-9; vol. i., p. 766.

Phlegmon and Abscess in the Abdominal Wall.

260. Phlegmon and abscess may be seated at any part of the wall. It may affect the tissues immediately beneath the peritoneum, or it may be more superficial, affecting chiefly the sub-cutaneous cellular tissue. When seated in the deeper tissues it is most likely to be mistaken for internal disease: when in the more superficial, its elevation, very superficial character, connexion with the skin, redness, etc., readily distinguish it. Deep-seated phlegmon, as when it originates in the sub-peritoneal cellular tissue, appears at first as a resistance to the hand, and subsequently as a palpable tumour ill circumscribed, flattened on the surface, the skin and cellular membranes gliding readily over it, and moving in a piece with the abdominal parietes. It produces a deficient abdominal respiratory expansion over the part which it affects, and over the corresponding lowest ribs. The tumour is firm at first, rather defective in resonance on superficial, but, according to its thickness and the condition of the subjacent intestine, sufficiently resonant on deep percussion. After a time it may become prominent, soften, and fluctuate, the skin becoming first fixed to the surface. The induration follows all the movements impressed upon the parietes. As it approaches the surface the skin reddens and becomes œdematous. When seated at the upper part of the abdomen it is sometimes not easy to distinguish it from hepatic abscess affecting the left lobe. In this case the absence of detrusion upwards of the heart or lungs is sometimes a useful ground of diagnosis. After softening and fluctuation have occurred, the base of the abscess still remains hard. When a tumour of this kind, situated at the epigastrium, increases, it may become the

seat of visible and palpable pulsation. When situated in the hypogastrium, an abscess in the wall may simulate distension of the bladder; or when in the hypochondriac, epigastric, or anterior lumbar regions, it may simulate an abscess of the liver, or a dilated gall-bladder.

Encysted Disease in the Abdominal Wall.

261. Encysted disease in the anterior wall of the abdomen may give rise to signs which may lead to the supposition that peritoneal effusion is present with enlargement of the solid viscera of the abdomen. From the rarity of the disease, however, the error is one which can seldom occur, although the possibility of it should be retained in mind. A case of this nature is recorded,* in which the middle and inferior regions of the abdomen were occupied by a smooth, firm, globular tumour of great size, projecting somewhat in a conical form with ill-defined boundaries, and obscurely fluctuating in the centre. It was supposed to be a tumour in the cavity of the abdomen, but its seat was between the peritoneum and the abdominal muscles. A more remarkable case than this is recorded by Dr. Scott,† in which there was great enlargement of the abdomen, and such symptoms as led to the operation of tapping. After the tapping a very large tumour was found to exist in the right side, occupying the hypochondriac and lumbar regions, and extending as far as the epigastric: this was taken for an enlarged liver. Extending to the left, and occupying the hypogastric, pubic, and right iliac regions, was another large tumour, apparently attached to the inferior portion of the one just described. Deeply seated in the hypochondriac and lumbar regions of the left side could be felt a third tumour, which appeared as large as a man's head, and was taken for the spleen. After death it was found that the fluid removed by tapping

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* Dublin Journal, O. S., vol. ii., p. 449.

† Med. Gazette, vol. xl., p. 907.

came from a large cyst in the parietes. The tumour in the left side consisted of a large cyst containing transparent serum, and that on the right side, suspected of being the liver, contained a number of cysts, adhered closely to the lateral wall of the abdomen, and was covered behind by the peritoneum.

Solid Tumour in the Abdominal Wall.

262. Solid tumours, solitary or numerous, may occupy any portion of the abdominal wall. When small, they may produce no visible elevation, and only be perceived by sliding the hand with gentle pressure over the surface. A solid tumour, however, may attain a large size and become very prominent. When the wall is sufficiently lax, these tumours may be easily circumscribed, and the finger can sometimes even be insinuated beneath their margin. They may be fixed or moveable, but in the latter case they can only be moved together with the part of the wall to which they belong. In a case recorded,* the margin was slightly irregular, and bands could be felt passing off from it in various directions; these proved to be portions of the stretched external oblique muscle. The consistence of the tumour, and the smoothness and regularity of its surface, vary with its nature. When cancerous, it may, as it enlarges, present nodulations upon its surface, and here and there softening with an indefinite and obscure sense of fluctuation.

Lumbar Abscess.

263. Abscess arising from caries of the vertebræ may either pass backwards and present itself posteriorly, or descend in the course of the psoas muscle, and produce fulness in the groin. When the abscess is considerable, there is general fulness of the corresponding side of the abdomen. When it points posteriorly, special prominence is noticed in the lumbar region, which may

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* Dublin Journal, O. S., vol. ii., p. 450.

extend forwards towards the anterior surface, and after a time fluctuation appears in it. An abscess pointing in this situation may be the seat of strong pulsation;* and the error of mistaking it for aneurism may even be committed. Dulness on percussion of course exists over a surface corresponding with the extent of the abscess. When the abscess passes downwards along the sheath of the psoas muscle, or is the result of psoitis, an elongated fusiform tumour is perceived on deep pressure in the flank, fixed, lying close to the spine, imperfectly circumscribed, and passing obliquely in the direction of the muscle from the vertebral column towards the crural arch. It is even upon the surface, dull upon percussion, and fluctuates. When pointing below Poupart's ligament, it forms a tumour on the inner side of the thigh, dull upon percussion, fluctuating, and receiving an impulse on coughing. A difficult diagnosis is assisted by observing the presence of an angular spinal curvature, and by noticing that the trunk is bent to the affected side, while the thigh is flexed and rotated outwards, for the purpose of relieving tension in the affected muscle.

Cancer of the Deep Lymphatic Glands of the Abdomen.

264. Cancer is the common cause of great enlargement of these glands. When affecting those *in the hollow of the sacrum*, the enlargement can be perceived on examination by the rectum, the tumour appearing fixed, and lying either posterior to the bowel, or pushing it to one side. When scirrhous, the hardness and irregularity of the tumour are remarkable. Cancer of the other glands, the lumbar and the internal iliac, is characterised by tumour discovered on deep palpation in the upper part of the iliac regions, or by the sides or in front of the vertebral column. When extensive, the iliac and lumbar glandular tumours unite to form a tumour extending from the abdomen deeply into

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* Cooper's Surgical Dictionary, p. 944.

the pelvis. It appears first in the form of hard knots in the regions mentioned, or forming an irregular, fixed, knotted tumour. This may attain a very large size, reaching upwards towards the diaphragm, displacing the resonance of the intestines entirely to one side of the abdomen, while itself occupies all the other side of the cavity. In other cases, part of the colon may be discovered in front of it, by its resonance on percussion. Of course, all the surface of the tumour which comes in contact with the wall, or which can be reached by the hand, is dull upon percussion. When very large, the tumour may reach as high as the epigastrium, and produce general abdominal enlargement. When obstructing the flow of blood in the vena cava, the superficial veins of the abdomen may exhibit enlargement. There may also, in such a case, be a murmur heard over the aorta, and at the epigastrium. A case which presented remarkable physical signs, is related by Mr. Howship.* A large rounded and elastic tumour was situated on the left side of the cavity of the abdomen, extending nearly to the cartilages of the ribs above, and to the margin of the pelvis below, and it was evidently attached to the posterior parietes: subsequently, it extended two-thirds across the abdomen. The pulsation of two large arteries was felt crossing it from right to left, in the front of the tumour, and the passage of flatus had been perceived through a portion of intestine running down the left side of the swelling; both vessels appeared to be continued from one trunk on the right, which rendered it probable that they were portions of the mesenteric artery passing across the tumour. It was discovered after death to be a tumour of one of the lumbar glands; the intestine on its left side was the sigmoid flexure of the colon, and the inferior layer of the mesocolon, with its vessels, formed the anterior covering of the tumour. The tumour had separated the two layers of the mesocolon, and was situated between them, carrying the intestine before it nearly to the front of the abdomen.

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* Med. Chir. Trans., vol. xix., p. 35.

Cancer of the Vertebræ.

265. Cancer of the vertebræ may produce abdominal tumour, which, from carrying forward the aorta, may in some degree simulate aneurism of the aorta. A case of this kind occurred under my notice, in a patient under the care of Dr. Taylor, at University College Hospital; and as it is the only one of the sort I have seen, and the physical signs were characteristic and well observed, I shall extract them from the published report.* The tumour, "apparently about three inches diameter, is situated just above the umbilicus, and rather to the right of the median line; it is hard and unyielding, deeply placed and immoveable, being apparently fixed to the vertebral column; there is a strong pulsation over it, but limited to its middle part; there is neither pulsation nor any sense of expansion in its lateral parts; there is a rough bellows or rasping murmur, synchronous with the arterial systole, but heard only where the pulsation is felt, and not at the sides of the swelling." After death it was found that "there was an enlargement, both anterior and lateral, in the lumbar region, about the third or fourth vertebræ, forming a tumour the size of a small orange; the aorta, just before it bifurcated, passed over the tumour, the surface of which was grooved where the vessel rested. The mass, on being incised, presented the characters of encephaloid disease."

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* Lancet, 1842; vol. i., p. 873.

PART III.

ENUMERATION OF THE MOST REMARKABLE PHYSICAL SIGNS, WITH THE DISEASES BY WHICH EACH MAY BE OCCASIONED.[1]

◆

INSPECTION.

266. *General abdominal enlargement*, 7.[2]

* Great enlargement of liver, 86, 96, 120.
Dilatation of gall-bladder, 105.
* Enlargement of spleen, 116, 120.
Enlargement of kidney, great, 126.
Dilatation of stomach, very great, 142.
* Flatulent distension of intestines, 152.
* Fæcal accumulations, 154.
* Intestinal obstruction, 156.
Inflammation of intestines, 157.
* Ascites, 166, 167, 170, 204, 244.
* Cysts, etc., ruptured into peritoneum, 169, 241.
* Acute peritonitis, 172.
* Chronic peritonitis, 177, 178.
Tuberculous disease of mesenteric glands, 179.
Cancer of peritoneum, 180.
* Hydatid disease of peritoneum, extensive, 181.
* Gas in peritoneum, 182.
* Pregnancy, 198, 204, 205, 206, 225, 246.
* Extra-uterine pregnancy, advanced, 209.
Hydatids of uterus, 215.
Hydrometra, 216.
Physometra, 217.
Fibrous tumour of uterus, 220, 223, 224, 225.
Soft polypus of uterus, 228.
* Encysted disease of ovary, 231, 240, 241, 244.
Solid ovarian tumour, fibrous, encephaloid, 247.
* Fat in abdominal wall, 259.
* Œdema of abdominal wall, 5.
Tumour in abdominal wall, 261.
Cancer of deep lymphatic glands, 264.

267. *Partial abdominal enlargement, occupying solely or principally*, 8.

a. Right hypochondrium.

* Enlargement of liver, 86, 96.
* Congestion of liver, 92.
* Hepatitis, 93.

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[1] In the diseases indicated thus [*], the sign is of sufficiently frequent occurrence, and sufficiently marked, to render it diagnostically important.

[2] The numbers affixed to each physical sign, and to each disease, refer to the numbered paragraphs of the work.

- * Abscess of liver, 94.
- * Cancer of liver, 98.
- * Hydatid disease of liver, 101.
- * Serous cysts of liver, on upper surface (great deformity of side), 103.
- * Dilatation of gall-bladder, considerable, 105.
- * Dilatation of bile ducts, 107.
- * Distension of liver with bile, 108.
- Fæcal accumulation in corresponding part of colon, 154.
- Duodenitis, 157.
- Circumscribed peritoneal abscess, 175.
- Aneurism of aorta, 249.
- * Phlegmon and abscess in abdominal wall, 260.
- Œdema of abdominal wall, 5, 94.

b. Left hypochondrium.

- Abscess of liver, left lobe, 94.
- Cancer of liver, left lobe, 98.
- * Enlargement of spleen, 116.
- * Abscess of spleen, 122.
- * Flatulent distension of stomach, 144.
- Fæcal accumulation in corresponding part of colon, 154.
- Circumscribed peritoneal abscess, 175.
- * Aneurism of aorta, 249.
- * Phlegmon and abscess in wall, 260.
- Œdema of wall, 5.

c. Epigastrium.

- * Enlargement of liver, 86, 96.
- * Congestion of liver, 92.
- * Hepatitis, 93.
- * Abscess of liver, 94.
- * Cancer of liver, 98.
- * Hydatid disease of liver, 1
- * Serous cyst of liver, 103.
- * Dilatation of bile ducts, 107.
- * Distension of liver with bile, 108.
- Cancer of pancreas, involving neighbouring tissues, 113.
- Enlargement of spleen, 116.
- * Flatulent distension of stomach, 144.
- Cancer of parietes of stomach, 148.
- Cancer of pylorus, involving neighbouring tissues, 149.
- Inflammation of stomach, 150.
- Concretion in stomach, 151.
- Circumscribed peritoneal abscess, 175.
- Cancer of omentum, extensive, 180.
- * Aneurism of aorta, 249.
- Aneurism of superior mesenteric artery, 254.
- * Phlegmon and abscess in wall, 260.
- Œdema of wall, 5, 94.

d. Upper part of abdomen, extensively.

- * Enlargement of liver, 86, 96.
- * Abscess of liver, 94.
- * Cancer of liver, 98.
- * Hydatid disease of liver, 101.
- * Dilatation of bile ducts, extensive, 107.
- * Distension of liver with bile, 108.
- * Dilatation of stomach, without downward displacement, 142.
- * Flatulent distension of stomach, 144.
- * Flatulent distension, affecting transverse colon, 152.

accumulation, consider-
in transverse colon, 154.
al obstruction, at or

below gastrosplenic curve of colon, 156.
Circumscribed peritoneal abscess, 175.
Tuberculous disease of omentum, extensive, 178.
Cancer of omentum, extensive, 180.
* Hydatid disease of peritoneum, 181.
Extra-uterine pregnancy, 209.
* Aneurism of aorta, 249.
Phlegmon and abscess of wall, 260.
Œdema of wall, 5.

e. Right flank and side of abdomen.

* Enlargement of liver, 86, 96.
* Abscess of liver, right lobe, large, 94.
* Cancer of liver, right lobe, 98.
* Hydatid disease of liver, 101.
Serous cyst of liver, 103.
* Dilatation of gall-bladder, great, 105.
Dilatation of bile ducts, 107.
Distension of liver with bile, 108.
* Enlargement of right kidney, great, 126.
* Pyelitis, with great purulent distension of right kidney, 130.
* Perinephritis, 131.
* Hydronephrosis, great, 132.
* Cysts of kidney, 133.
* Cancer of kidney, 134.
Enlargement of supra-renal capsule, 139.
* Flatulent distension of cæcum and ascending colon, 152.
* Fæcal accumulations, considerable, 154.
* Intestinal obstruction, near or beyond hepatic curve of colon, 156.
* Ascites (when lying on right side), 166.
Circumscribed peritoneal abscess, 175.
Chronic peritonitis, 177.
Cancer of peritoneum, 180.
Hydatid disease of peritoneum, 181.
Extra-uterine pregnancy, 209.
* Encysted disease of ovary, 231, 243.
Aneurism of aorta, 249, 252.
* Phlegmon and abscess in wall, 260.
Tumour in wall, 261, 262.
Lumbar abscess, 263.
* Œdema of wall, 5.

f. Left flank and side of abdomen.

* Enlargement of spleen, considerable, or with downward displacement, 116, 120.
* Enlargement of left kidney, great, 126.
* Pyelitis, with great purulent distension of left kidney, 130.
* Perinephritis, 131.
* Hydronephrosis, great, 132.
* Cysts of kidney, 133.
* Cancer of kidney, 134.
Enlargement of supra-renal capsule, 139.
* Displacement of stomach with flatulence, 141.
* Flatulent distension of descending colon and sigmoid flexure, 152.
* Fæcal accumulation, considerable, 154.

- * Intestinal obstruction in sigmoid flexure or rectum, 156.
- * Ascites (when lying on left side), 166.
- Circumscribed peritoneal abscess, 175.
- Chronic peritonitis, 177.
- Cancer of peritoneum, 180.
- Hydatid disease of peritoneum, 181.
- Extra-uterine pregnancy, 209.
- * Encysted disease of ovary, 231, 243.
- * Aneurism of aorta, 249, 252.
- Aneurism of renal artery, 255.
- * Phlegmon and abscess in wall, 260.
- * Œdema of wall, 5.
- Tumour in wall, 261, 262.
- Lumbar abscess, 263.

g. Umbilical region.

- Abscess of liver, 94.
- Cancer of liver, 98.
- Hydatid disease of liver, 101.
- Dilatation of gall-bladder, 105.
- Abscess of gall-bladder, 109.
- * Enlargement of spleen, considerable, with displacement, 116.
- Abscess of spleen ("pointing"), 122.
- * Displacement of stomach downwards, with flatulence, 141.
- Cancer of pylorus, involving neighbouring tissues extensively, 149.
- Concretion in stomach, 151.
- * Flatulent distension of intestines, 152.
- * Fæcal accumulation, great in transverse colon, 154.
- * Intestinal obstruction at or near gastrosplenic curve of colon, 156.
- Cancer of transverse colon, extensive, 163.
- * Circumscribed peritoneal abscess, 175.
- Cancer of omentum, extensive, 180.
- Hydatid disease of omentum, 181.
- Extra-uterine pregnancy, 209.
- * Aneurism of aorta, 249.
- * Fat in wall, 259.
- * Phlegmon and abscess in wall, 260.
- Tumour in wall, 261, 262.

h. Right postero-lumbar region.

- Abscess of liver, 94.
- * Enlargement of right kidney, great, 126.
- * Pyelitis, with great purulent distension of right kidney, 130.
- * Perinephritis (with œdema), 131.
- Hydronephrosis, great, 132.
- Cysts of kidney, 133.
- Cancer of kidney, 134.
- Intestinal obstruction, at hepatic curve of colon, 156.
- * Abscess in posterior abdominal wall, 159.
- * Lumbar abscess, 263.
- * Œdema of wall, 5, 131.

i. Left postero-lumbar region.

- Abscess of spleen, 122.
- * Enlargement of left kidney, great, 126.
- * Pyelitis, with great purulent distension of left kidney, 130.
- * Perinephritis (with œdema), 131.
- Hydronephrosis, great, 132.
- Cysts of left kidney, 133.

Cancer of left kidney, 134.
* Aneurism of aorta, 249.
* Lumbar abscess, 263.
* Œdema of wall, 5, 131.

k. Right iliac region.

* Flatulent distension of cæcum, 152, 153.
* Fæcal accumulation, considerable in cæcum, 154.
Intestinal concretions, large, 155.
* Intestinal obstruction, above cæcum, 156.
* Typhlitis, 159.
* Cancer of cæcum, extensive, 163.
* Circumscribed peritoneal abscess, 175.
* Cancer of peritoneum, 180.
* Displacement of bladder upwards and to right, 185.
* Pelvic inflammation and abscess, 187.
* Pregnancy, with lateral obliquity, 203.
* Extra-uterine pregnancy, 209, 213.
Retention of menses, 214.
Fibrous tumour of uterus, 224, 220.
* Inflammation and abscess of ovary, 230.
* Encysted disease of ovary, 231.
* Solid ovarian tumour, 247.
Aneurism of aorta, 249.
* Aneurism of iliac artery, 256.
* Phlegmon and abscess in wall, 260.
* Œdema of wall, 5.
Tumour in wall, 261, 262.
* Psoas abscess, 263.

l. Left iliac region.

* Flatulent distension, sigmoid flexure, 152, 153.
* Fæcal accumulation, considerable, 154.
Intestinal concretion, large, 155.
* Intestinal obstruction, in sigmoid flexure or rectum, 156.
* Cancer of sigmoid flexure, extensive, 163.
* Circumscribed peritoneal abscess, 175.
* Cancer of peritoneum, 180.
* Displacement of bladder upwards and to left, 185.
* Pelvic inflammation and abscess, 187.
* Pregnancy, with lateral obliquity, 203.
* Extra-uterine pregnancy, 209, 213.
Retention of menses, 214.
Fibrous tumour of uterus, 220.
* Inflammation and abscess of ovary, 230.
* Encysted disease of ovary, 231.
* Solid ovarian tumour, 247.
Aneurism of aorta, 249.
* Aneurism of external iliac artery, 256.
* Phlegmon and abscess in wall, 160, 260.
* Œdema in wall, 5.
Tumour in wall, 261, 262.
* Psoas abscess, 263.

m. Hypogastrium.

* Flatulent intestinal distension, 152, 198.
Fæcal accumulation, 154.

* Circumscribed peritoneal abscess, 175.
* Cancer of peritoneum, 180.
Hydatid cyst, 181, 186.
* Distension of bladder, 184, 185.
* Pelvic abscess, 187.
Displacement of uterus upwards, 190
* Pregnancy, 198, 207.
* Extra-uterine pregnancy, 209.
* Retention of menses, 214.
* Hydatids of uterus, 215.
* Hydrometra, 216.
* Physometra, 217.
* Congestion or hypertrophy of uterus, 218.
* Fibrous tumour of uterus, 219, 220, 226.
* Cancer of body of uterus, 227.
* Soft polypus of uterus, 228.
* Inflammation and abscess of ovary, 230.
Encysted disease of ovary, 231.
* Œdema of wall, 5.
* Phlegmon and abscess in wall, 260.
Tumour in wall, 261, 262.

n. Lower part of abdomen, extensively.

* Dilatation of stomach, great, with downward displacement, 142.
* Flatulent intestinal distension, 152, 198.
Fæcal accumulation, considerable, 154.
Intestinal obstruction, 156.
* Ascites, 166, 244.
* Cysts, etc., ruptured into peritoneum, 169, 241.
* Hæmorrhage into peritoneum, abundant, 171.
Acute peritonitis, 172.
Circumscribed peritoneal abscess, 175.
* Chronic peritonitis, 177, 178.
* Cancer of peritoneum, 180.
* Distension of bladder, great, 184.
* Pregnancy, 198, 207, 225, 246.
* Extra-uterine pregnancy, 209.
Retention of menses, 214.
* Hydatids of uterus, 215.
* Hydrometra, 216.
Physometra, 217.
* Fibrous tumour of uterus, 219, 220, 224, 225, 226.
* Cancer of body of uterus, 227.
* Soft polypus of uterus, 228.
* Encysted disease of ovary, 231, 240, 244, 246.
* Solid ovarian tumour, 247.
* Fat in wall, 259.
* Œdema of wall, 5.
* Phlegmon and abscess in wall, 260.
Tumour in wall, 261, 262.

268. *General or partial enlargement altered in seat or degree by change of posture*, 7, 8.

* Enlargement of spleen, great, 116.
* Dilatation of stomach, 142.
* Ascites, 166, 170.
Hæmorrhage into peritoneum, 171.
* Cysts, etc., ruptured into peritoneum, 169, 241.

269. *General abdominal retraction*, 9.

* Narrowing of pyloric orifice, from hypertrophy, 146, cancer, 149.
* Cancer of cardia, 147.
* Starvation, 147.
* Prolonged vomiting, 150.

Colic, 153.
* Intestinal obstruction, duodenum, or high in small intestines, 156.

Prolonged diarrhœa, 157.
Chronic peritonitis, 177.

270. *Partial abdominal retraction*, 10.

a. *Left hypochondrium and epigastrium.*

Displacement of stomach, 141.
* Contraction of stomach, 145.

Prolonged vomiting, 150.

b. *Umbilical region.*

* Colic, 153.

c. *Hypogastrium.*

Prolapsus uteri, 189.
Retroversion of uterus, 192.
Pregnancy, in early stage, 198.

d. *Lower part of abdomen extensively.*

Cancer of pylorus, 149.
Intestinal obstruction, duodenum, 156.

271. *Form of intestines visible on exterior of abdomen*, 11.

a. *Convolutions of small intestines.*

* Flatulent distension, small intestines, 152.
* Intestinal obstruction, especially near ileo-colic valve, 156.
* Chronic peritonitis, 177, 178.

b. *Colon.*

* Flatulent distension, 152.
* Intestinal obstruction, in sigmoid flexure or rectum, 156.

272. *Protrusion of vaginal wall beyond os externum*, 12.

Ascites, 166.
Chronic peritonitis, 178.
* Displacement downwards of bladder, 185, 189.
* Procidentia of uterus, 189.

Retroversion of uterus, 192.

273. *Umbilicus proportionally too near sternum*, 13.

See Mensuration (288).

274. *Umbilicus proportionally too near pubes*, 13.

See Mensuration (287).

275. *Depression of umbilicus lessened or replaced by prominence*, 14.

Enlargement of liver, considerable, 86, 96.
Cancer of liver, 98.
Flatulent distension of intestines, 152.
Ascites, 156.

Acute peritonitis, 172.
Circumscribed peritoneal abscess, 175.
Chronic peritonitis, 177, 178.
Cancer of peritoneum, 180.
Hydatid disease of peritoneum, 181.
Gas in peritoneum, 182.
Pregnancy, 198.
Extra-uterine pregnancy, 209.
Encysted disease of ovary, 231.

276. *Umbilicus stretched and flattened out*, 14.

Colloid cancer of peritoneum, 180.

277. *Depression of umbilicus increased*, 14.

Pregnancy, early, 198.
* Fat in wall, 259.
* Œdema of wall, 14.

278. *Enlargement of superficial veins of abdomen*, 15.

Enlargement of liver, great, 86, 96.
Abscess of liver, 94.
* Cancer of liver, large, or obstructing large venous trunks, 100.
Hydatid disease of liver, extensive, 101.
Enlargement of spleen, considerable, 116.
Enlargement of kidney, great, 126.
Cancer of kidney, 134.
Ascites, 166, 170.
* Chronic peritonitis, 177, 178.
* Tuberculous disease of mesenteric glands, 179.
* Cancer of peritoneum, its folds and appendages, 180.
* Hydatid disease of peritoneum, 181.
Pregnancy, 198.
Fibrous tumour of uterus, 220.
Encysted disease of ovary, 231.
Aneurism of aorta, 249.
Varicose aneurism, 257.
* Occlusion of large veins of abdomen, 258.
* Cancer of deep lymphatic glands, 264.

279. *Visible pulsation*, 16.

Cancer of pylorus, involving neighbouring tissues, 149.
Fæcal accumulation, 154.
* Nervous abdominal pulsation, 248.
* Aneurism of aorta, 249.
* Aneurism of superior mesenteric artery, 254.
Phlegmon and abscess in wall, 260.
Diseases producing general abdominal retraction, 269.

280. *Visible movements*, 17.

a. Irregular knottings lasting a variable time and then subsiding.

* Colic, 17, 153.

b. Vermicular.

* Flatulent intestinal distension, where convolutions are traceable, 152.

* Contraction of abdominal muscles, 17.
* Intestinal obstruction, 156.
* Chronic peritonitis, 177, 178.

c. Abrupt elevations resembling movements of a living body in abdomen.

Intestinal flatulence, 17, 152.
* Pregnancy, 198.
* Extra-uterine pregnancy, 209.

281. *Defective abdominal respiratory movement*, 19.

a. On both sides.

Flatulent distension of intestines, 152.
Intestinal obstruction, 156.
Intestinal inflammation, 157.
Ascites, 166, 170.
* Acute peritonitis, 172.
* Circumscribed peritoneal abscess, extensive at upper part of abdomen, 175.

Chronic peritonitis, 177.
Cancer of peritoneum, with great enlargement of abdomen, 180.
Hydatid disease of peritoneum, extensive, 181.
Gas in peritoneum, abundant, 183.
Pregnancy, 198, 204, 205.
Encysted disease of ovary, 231, 243.
Aneurism of aorta, 249.

b. On right side generally.

Enlargement of liver, considerable, 86, 96.
* Congestion of liver, 92.

Hepatitis, 93.
* Abscess of liver, 94.

Cancer of liver, extensive, right lobe, 98.
Hydatid disease of liver, extensive, 101.
* Enlargement of right kidney, great, 126.
* Peritonitis on right side, 173.
* Adhesion of liver, 174.
* Circumscribed peritoneal abscess below diaphragm, 175.

c. On left side generally.

Cancer of liver, left lobe, extensive, 98.
* Enlargement of spleen, great, 116.
* Enlargement of left kidney, great, 126.
* Diaphragmatic hernia, 140.
* Flatulent distension of stomach, great, 144.
* Inflammation of stomach, 150.
* Peritonitis on left side, 173.

d. Over some special locality.

* Seat of painful disease, 19.
* Local peritonitis, 173.
* Circumscribed peritoneal abscess, 175.
* Phlegmon and abscess in wall, 260.

282. *Altered rhythm of respiration*, 20.

* Peritonitis, 172.

MENSURATION.

283. *Symmetrical increase of circular measurements of abdomen*, 26.

Dilatation of stomach, with downward displacement, 142.
* Flatulent intestinal distension, 152.
Fæcal accumulation, 154.
* Intestinal obstruction, 156.
Inflammation of intestines, 157.
* Ascites, 166.
* Acute peritonitis, 172.
* Chronic peritonitis, 177, 178.
Tuberculous disease of mesenteric glands, 179.
Cancer of peritoneum, 180.
* Gas in peritoneum, 182.
* Distension of bladder, great, 184.
* Pregnancy, 198, 204, 205, 207.
* Hydatids of uterus, with great enlargement, 215.
* Hydrometra, extensive, 216.
* Physometra, extensive, 217.
Fibrous tumour of uterus, 219.
Soft polypus of uterus, 228.
Encysted disease of ovary, 232, 241.
Solid ovarian tumour, 247.
* Fat in wall, 259.
Œdema of wall.

284. *Unsymmetrical increase of circular measurements of abdomen*, 26.

a. Right side in excess.

* Enlargement of liver, 87.
Congestion of liver, 92.
Hepatitis, 93.
* Abscess of liver, 94.
* Cancer of liver, 98.
* Hydatid disease of liver, 101.
Serous cyst of liver, 105.
* Dilatation of gall-bladder, extensive, 105.
* Enlargement of right kidney, great, 126.
* Pyelitis, with great purulent distension of kidney, 130.
* Perinephritis, 131.
* Hydronephrosis, great, 132.
* Cysts of kidney, 133.
* Cancer of kidney, 134.
Enlargement of supra-renal capsule, 139.
* Flatulent distension of cæcum and ascending colon, 152.
Fæcal accumulation, 154.
* Intestinal obstruction, near or beyond hepatic curve of colon, 156.
Chronic peritonitis, effusion limited to right side, 177.
* Hydatid disease of peritoneum, extensive, 181.
* Extra-uterine pregnancy, 209.
Fibrous tumour of uterus, 219.
Encysted disease of ovary, 232.
Solid ovarian tumour, adherent, 247.
Lumbar abscess, 263.
Œdema of wall.

b. Left side in excess.

* Enlargement of spleen, 87.
* Congestion of spleen, great, 121.
* Enlargement of left kidney, great, 126.

* Pyelitis, with great purulent distension of kidney, 130.
* Perinephritis, 131.
* Hydronephrosis, great, 132.
* Cysts of kidney, 133.
* Cancer of kidney, 134.
Enlargement of supra-renal capsule, 139.
* Flatulent distension of stomach, 144.
* Flatulent distension of sigmoid flexure and descending colon, 152.
Fæcal accumulation, 154.
Intestinal obstruction in sigmoid flexure and rectum, 156.
Chronic peritonitis, effusion limited to left side, 177.
* Hydatid disease of peritoneum, extensive, 181.
* Extra-uterine pregnancy, 209.
Fibrous tumour of uterus, 219.
Encysted disease of ovary, 232.
Solid ovarian tumour, adherent, 247.
Aneurism of aorta, 249.
Lumbar abscess, 263.
Œdema of wall.

285. *Symmetrical diminution of circular measurements of abdomen*, 26.

* Diseases producing general abdominal retraction (269), unaccompanied by any disease productive of fulness or tumour upon one side.

286. *Unsymmetrical diminution of circular measurements of abdomen*, 26.

* Diseases producing general abdominal retraction (269), accompanied by some cause of fulness or tumour upon one side.

287. *Proportional distance between umbilicus and sternum increased*, 26.

Enlargement of liver, considerable, 87, 96.
Cancer of liver, extensive, 100.
Ascites, 166.
Tuberculous disease of omentum, extensive, 178.
Hydatid disease of peritoneum, 181.

288. *Proportional distance between umbilicus and pubes increased*, 26.

Ascites, 166.
Encysted disease of ovary, 232, 243.

289. *Defective abdominal respiratory movement*, 26.

a. On both sides.

See Inspection, 281.

b. On right side generally.

See Inspection, 281.

c. On left side generally.
See Inspection, 281.

d. Over some special locality.
See Inspection, 281.

290. *Altered rhythm of respiratory movements*, 20.
See Inspection, 282.

PALPATION.

291. *Resistance of parietes to pressure increased*, 30.

a. From muscular rigidity, yielding partially or entirely to even, steady and continued pressure.

Congestion of liver, 92.
* Hepatitis, 93.
* Abscess of liver, 94.
* Inflammation of gall-bladder, 109.
Congestion of spleen, 121.
* Inflammation of spleen, 122.
Cancer of stomach, 149.
* Inflammation of stomach, 150.
Flatulent distension of intestines, 152.
* Colic, 153.
Fæcal accumulation, 154.
Intestinal obstruction, 156.
* Inflammation of intestines, 157, 159, 160.
* Acute peritonitis, 169, 172, 173.
* Circumscribed peritoneal abscess, 175.
* Pelvic inflammation and abscess, 187, 230.
* Congestion of uterus and metritis, 218.

b. From other physical obstacles.

* Congestion of liver, 92.[1]
* Hepatitis, 93.[1]
* Fatty liver, 97.[1]
* Congestion of spleen, 121.[2]
* Inflammation of spleen, 122.[2]
* Flatulent distension of stomach, with tense parietes, 144.[3]
* Hypertrophy of stomach, 146.[3]
Flatulent distension of intestines, with tense parietes, 152.
* Intestinal obstruction, 156.
* Ascites, 166, 169, 170.
* Hæmorrhage into peritoneum, 171.
* Circumscribed peritoneal abscess, 175.
* Chronic peritonitis, 177, 178, 223.
* Cancer of peritoneum, 180.
* Hydatid disease of peritoneum, 181, 186.
* Pregnancy, 199, 204, 205.
* Phlegmon and abscess in wall, 260.
* Diseases producing abdominal retraction, 269.
* Diseases producing superficial and extended tumour, 297.[4]

[1] Below margin of right ribs and epigastrium.
[2] Below margin of left ribs and epigastrium.
[3] Epigastrium.
[4] For special seats of *tumours* producing resistance, see (297).

292. *Sense of thickening of parietes*, 30.

Ascites, 170.
Chronic peritonitis, 177, 178.
Cancer of peritoneum, 180.
Fat in wall, 259.
Œdema of wall, 30.

293. *Resistance of parietes to pressure diminished*, 31.

* Flatulent distension of stomach (over its seat), 144.
* Flatulent distension of intestines, 152.
* Gas in peritoneum, 182, 183.

294. *Sense of thinning of parietes*, 31.

* Flatulent distension of stomach (over its seat), 144.
* Flatulent distension of intestines, 152.
* Gas in peritoneum, 182, 183.

295. *Elasticity of parietes increased*, 32.

* Flatulent distension of stomach (over its seat), 144.
* Flatulent distension of intestines, 152.
* Gas in peritoneum, 182, 183.

296. *Elasticity of parietes diminished*, 33.

* Dilatation of stomach, 142.
* Intestinal obstruction, 156.
* Ascites, 166, 169, 170.
* Hæmorrhage into peritoneum, 171.
* Chronic peritonitis, 177, 178.
* Cancer of peritoneum, 180.
* Hydatid disease of peritoneum, 181, 186.
* Distension of bladder, 184, 185.
* Pregnancy, 199, 204, 205.
* Encysted disease of ovary, 233.
* Fat in wall, 259.
* Diseases producing abdominal retraction, 269

297. *Tumour, occupying solely or principally*, 34.

a. Right hypochondrium.

* Enlargement of liver, 88, 96.
* Displacement of liver, 91.
Congestion of liver, 92.
Hepatitis, 93.
* Abscess of liver, 94.
Fatty liver, 97.
* Cancer of liver, 98.
* Hydatid disease of liver, 101.
* Serous cyst of liver, 103.
* Dilatation of gall-bladder, 105.
* Dilatation of bile ducts, 107.
* Distension of liver with bile, 108.
Cancer of pancreas, of head (deep), 113.
* Cancer of right kidney, 134.
Cancer of pylorus, 149.
* Fæcal accumulation, 154.
* Intestinal concretion, 155.
* Cancer of duodenum, 162.

Circumscribed peritoneal abscess, 175.
* Cancer of peritoneum, omentum, etc., 180.
* Hydatid disease of peritoneum, 181.
Aneurism of aorta, 250.
* Phlegmon and abscess in wall, 260.
Tumour in wall, 261.

b. Left hypochondrium.

* Abscess of liver, left lobe, 94.
* Cancer of liver, left lobe, 98.
* Displacement of spleen downwards, 115.
* Enlargement of spleen, 117.
* Congestion of spleen, 121.
Inflammation of spleen, 122.
* Cancer of spleen, 123.
* Hydatid disease of spleen, 124.
Displacement of kidney, 125.
* Cancer of left kidney, 134.
Cancer of pylorus, with displacement, 149.
* Fæcal accumulation, 154.
* Intestinal concretion, 155.
Circumscribed peritoneal abscess, 175.
Tuberculous disease of omentum, 178.
Cancer of peritoneum, 180.
Hydatid disease of peritoneum, 124, 181.
* Aneurism of aorta, 250.
* Aneurism of cœliac artery, 253.
* Phlegmon and abscess in wall, 260.

c. Epigastrium.

* Enlargement of liver, especially of left lobe, 88, 96.
Displacement of liver, 91.
Congestion of liver, 92.
Hepatitis, 93.
* Abscess of liver, 94.
Fatty liver, 97.
* Cancer of liver, 98.
* Hydatid disease of liver, 101.
* Serous cyst of liver, 103.
* Cirrhosis of liver, (by sudden deep pressure through liquid), 104.
* Dilatation of bile ducts, 107.
* Distension of liver with bile, 108.
Inflammation or abscess of pancreas, (deep and obscure), 112.
* Cancer of pancreas, (deep), 113.
Enlargement of spleen, 117.
* Hypertrophy of stomach, 146.
Cancer of cardiac extremity of stomach, (deep, high up, and obscure), 147.
* Cancer of parietes of stomach, 148.
* Cancer of pylorus, 149.
* Concretion in stomach, 151.
Circumscribed peritoneal abscess, 175.
* Cancer of peritoneum, omentum, 180.
* Aneurism of aorta, 250.
* Aneurism of cœliac artery, 253.
* Aneurism of superior mesenteric artery, 254.
* Phlegmon and abscess in wall, 260.

d. Upper part of abdomen, extensively.

* Enlargement of liver, great, 88, 96.
* Abscess of liver, 94.
* Cancer of liver, 98.
Fatty liver, 97.

- * Hydatid disease of liver, 101.
- Dilatation of bile ducts, extensive, 107.
- * Distension of liver with bile, 108.
- * Fæcal accumulation, 154.
- Intestinal obstruction, 156.
- * Tuberculous disease of omentum, 178.
- * Cancer of peritoneum, omentum, 180.
- Extra-uterine pregnancy, 210.
- Phlegmon and abscess in wall, 260.

e. Right flank and side of abdomen.

- * Enlargement of liver, 88, 96.
- * Dilatation of liver downwards, considerable, 91.
- * Abscess of liver, large, right lobe, 94.
- Fatty liver, 97.
- * Cancer of liver, right lobe, 98.
- * Hydatid disease of liver, 101.
- Serous cyst of liver, 103.
- * Dilatation of gall-bladder, great, 105.
- Dilatation of bile ducts, 107.
- Distension of liver with bile, 108.
- * Moveable kidney, (deep), 125.
- * Enlargement of right kidney, 127.
- Congestion of kidney, with much enlargement, (deep), 126.
- Nephritis, with much enlargement, (deep), 126.
- * Pyelitis, with purulent distension of kidney, 130.
- * Perinephritis, 131.
- * Hydronephrosis, 132.
- * Cysts of kidney, 133.
- * Cancer of kidney, 134.
- Tuberculous disease of kidney, (deep), 135.
- * Enlargement of supra-renal capsule, considerable, 139.
- Cancer of pylorus, with displacement, 149.
- * Fæcal accumulation, 154.
- * Intestinal concretion, 155.
- Intestinal obstruction, 156.
- * Circumscribed peritoneal abscess, 175.
- * Tuberculous disease of peritoneum, 178.
- Cancer of peritoneum, omentum, 180.
- * Hydatid disease in peritoneum, 181.
- Extra-uterine pregnancy, 210.
- * Encysted disease of ovary, 233, 234, 240, 243, 246.
- Aneurism of aorta, 250, 252.
- Aneurism of renal artery, 255.
- * Phlegmon and abscess in wall, 260.
- * Tumour in wall, 261, 262.
- * Psoas abscess, (deep), 263.
- * Cancer of deep lymphatic glands, (deep), 264.

f. Left flank and side of abdomen.

- * Displacement of spleen downwards, 115.
- * Enlargement of spleen, 117, 120.
- Congestion of spleen, great, 121.
- * Moveable kidney, (deep), 125.
- * Enlargement of left kidney, 120, 127.
- Congestion of kidney, with much enlargement, (deep), 126.
- Nephritis, with much enlargement, (deep), 126.

- * Pyelitis, with purulent distension of kidney, 130.
- * Perinephritis, 131.
- * Hydronephrosis, 132.
- * Cysts of kidney, 133.
- * Cancer of kidney, 134.
- Tuberculous disease of kidney, (deep), 135.
- * Enlargement of supra-renal capsule, considerable, 139.
- Cancer of pylorus, with displacement, 149.
- * Fæcal accumulation, 154.
- * Intestinal concretion, 155.
- Intestinal obstruction, 156.
- * Inflammatory thickening of descending colon, 160.
- * Circumscribed peritoneal abscess, 175.
- * Tuberculous disease of peritoneum, 178.
- * Cancer of peritoneum, mesentery, 180.
- * Hydatid disease in peritoneum, 181.
- Extra-uterine pregnancy, 210.
- * Encysted disease of ovary, 233, 234, 240, 243, 246.
- * Aneurism of aorta, 250, 252.
- Aneurism of renal artery, 255.
- * Phlegmon and abscess in wall, 260.
- * Tumour in wall, 261, 262.
- * Psoas abscess, (deep), 263.
- * Cancer of deep lymphatic glands, (deep), 264.

g. Umbilical region.

- Abscess of liver, 94.
- * Cancer of liver, 98.
- Hydatid disease of liver, 101.
- Dilatation of gall-bladder, 105.
- Abscess of gall-bladder, 109.
- * Cancer of pancreas, (deep), 113.
- Displacement of head of pancreas downwards, 114.
- Enlargement of spleen, with displacement, 117.
- * Cancer of pylorus, 149.
- * Concretion in stomach, with displacement, 151.
- * Fæcal accumulation, in transverse colon, 154.
- * Intestinal concretion, 155.
- Intestinal obstruction, 156.
- * Cancer of duodenum, 162.
- * Cancer of transverse colon, 163.
- * Inflammatory intestinal thickening, 158.
- * Circumscribed peritoneal abscess, 175.
- * Tuberculous disease of omentum, 178.
- * Tuberculous disease of mesenteric glands, (deep), 179.
- * Cancer of peritoneum, omentum, mesentery, 180.
- * Hydatid disease of omentum, 181.
- Extra-uterine pregnancy, 210.
- Lumbar curve excessive, 248.
- * Aneurism of aorta, 250.
- * Aneurism of superior mesenteric artery, 254.
- * Phlegmon and abscess in wall, 260.
- * Tumour in abdominal wall, 261, 262.
- * Cancer of deep lymphatic glands, (deep), 264.
- * Cancer of vertebræ, (deep), 265.

h. Right iliac region.

- * Displacement of right kidney, 125.
- Thickening and dilatation of ureter, 138.

Cancer of pylorus, with displacement, 149.
- * Flatulent distension of cæcum, 152.
- * Fæcal accumulation, 154.
- * Intestinal concretion, 155.
- * Intestinal obstruction, above cæcum, 156.
- * Typhlitis, 159.
- * Cancer of cæcum, 163.
- * Circumscribed peritoneal abscess, 175.
- * Tuberculous disease of peritoneum, 178.
- * Cancer of peritoneum, 180.
- * Displacement of bladder, 185.
- * Pelvic abscess, 187.
- * Pregnancy, with lateral obliquity, 203.
- * Extra-uterine pregnancy, 210, 213.

Retention of menses, 214.

Fibrous tumour of uterus, 220, 224.
- * Inflammation and abscess of ovary, 230.
- * Encysted disease of ovary, 233.
- * Solid ovarian tumour, 247.

Aneurism of aorta, 250.
- * Aneurism of external iliac artery, 256, 257.
- * Phlegmon and abscess in wall, 260.
- * Tumour in wall, 261, 262.
- * Psoas abscess, 263.
- * Cancer or other enlargement of deep lymphatic glands, 264.

i. Left iliac region.

Displacement of spleen, with or without enlargement, 115.
- * Displacement of left kidney, 125.

Thickening and dilatation of ureter, 138.
- * Concretion in stomach, with displacement, 151.
- * Fæcal accumulation in sigmoid flexure, 154.
- * Intestinal concretion, 155.

Intestinal obstruction, in rectum or sigmoid flexure, 156.
- * Inflammatory thickening of sigmoid flexure, 160.
- * Cancer of sigmoid flexure, 163.
- * Circumscribed peritoneal abscess, 175.
- * Tuberculous disease of peritoneum, 178.
- * Cancer of peritoneum, 180.
- * Displacement of bladder, 185.
- * Pelvic abscess, 187.
- * Pregnancy with lateral obliquity, 203.
- * Extra-uterine pregnancy, 209, 213.

Retention of menses, 214.

Fibrous tumour of uterus, 220.
- * Inflammation and abscess of ovary, 230.
- * Encysted disease of ovary, 233.
- * Solid ovarian tumour, 247.

Aneurism of aorta, 250.
- * Aneurism of external iliac artery, 256, 257.
- * Phlegmon and abscess in wall, 260.
- * Tumour in wall, 261, 262.
- * Psoas abscess, 263.
- * Cancer or other enlargement of deep lymphatic glands, 264.

k. Hypogastrium.

Cancer of pylorus, with displacement, 149.
- * Fæcal accumulation, 154.

- * Circumscribed peritoneal abscess, 175.
- * Tuberculous disease of peritoneum, 178.
- * Cancer of peritoneum, 180.
- * Hydatid disease of peritoneum, 181, 186.
- * Distension of bladder, 184, 206.
- * Pelvic abscess, 187.
- * Displacement of uterus upwards, 190, 194.
- * Pregnancy, 199, 207.
- * Extra-uterine pregnancy, 209.
- * Retention of menses, 214.
- * Hydatids of uterus, 215.
- * Hydrometra, 216.
- * Physometra, 217.
- * Congestion and hypertrophy of uterus, 218.
- * Fibrous tumour in uterus, 219, 220, 226.
- * Cancer of body of uterus, 227.
- * Soft polypus of uterus, 228.
- * Inflammation and abscess of ovary, 230.
- * Encysted disease of ovary, 233.
- * Phlegmon and abscess in wall, 260.
- * Tumour in wall, 261.

l. Lower part of abdomen, extensively.

- * Fæcal accumulation, 154.
- * Tuberculous disease of peritoneum, 178.
- * Cancer of peritoneum, 180.
- * Hydatid disease of peritoneum, 181.
- * Distension of bladder, great, 184.
- * Pregnancy, 199, 207, 225, 246.
- * Extra-uterine pregnancy, 209.
- * Retention of menses, 214.
- * Hydatids of uterus, 215.
- * Hydrometra, 216.
- Physometra, 217.
- * Fibrous tumour of uterus, 219, 220, 224, 225, 226.
- * Cancer of body of uterus, 227.
- * Soft polypus of uterus, 228.
- * Encysted disease of ovary, 233, 240, 244, 246.
- * Solid ovarian tumour, 247.
- * Phlegmon and abscess in wall, 260.
- * Tumour in wall, 261, 262.

m. The whole or the greater part of the abdomen.

- * Enlargement of liver, very great, 80, 96, 120.
- Abscess of liver, 94.
- Hydatid disease of liver, very extensive, 101.
- Serous cysts of liver, very large, 103.
- Dilatation of gall-bladder, very extensive, 105.
- * Enlargement of spleen, 117, 120.
- * Cancer of peritoneum, omentum, mesentery, 180.
- * Hydatid disease of peritoneum, 181.
- * Pregnancy, 199, 205, 225.
- * Extra-uterine pregnancy, advanced, 210.
- Hydatids of uterus, 215.
- Hydrometra, 216.
- Physometra, 217.
- Fibrous tumour of uterus, 219, 225.
- Soft polypus of uterus, 228.
- * Encysted disease of ovary, 233, 240, 246.
- Solid ovarian tumour, 247.
- Aneurism of aorta, 250.
- Tumour in wall, 261, 262.
- Cancer of deep lymphatic glands, 264.

298. *Tumour felt on sudden deep pressure*, 34.

* Ascites, 98, 104, 167, 178, 180, 204, 223, 244.

299. *Tumour immoveable*, 34.

* From great size, impaction, or disease in or adhesion to immoveable parts or organs, 101, 112, 113, 127, 130, 131, 132, 133, 134, 135, 149, 154, 159, 163, 174, 175, 178, 179, 180, 181, 186, 214, 220, 243, 247, 250, 252, 260, 261, 262, 263, 264, 265.

300. *Tumour altered in seat, or readiness of perception, by change of posture*, 34.

Dilatation of gall-bladder, 105.
* Displacement of spleen, 115.
* Enlargement of spleen, 117.
* Cancer of pylorus, 149.
* Concretion in stomach, 151.
* Fæcal accumulation, in moveable portion of intestine, 154.
* Intestinal concretion, in moveable portion of intestine, 155.
* Extra-uterine pregnancy, 210.
Aneurism of aorta, 250.
Aneurism of superior mesenteric artery, 254.

301. *Mobility of abdominal parietes lessened*, 35.

* Peritoneal adhesion, 174, 243.
* Chronic peritonitis, 177, 178.
* Phlegmon and abscess in wall 260.

302. *Sense of movement beneath the hand*, 36.

a. Expansion and subsidence.

* Colic, 153.

b. Vermicular movement.

* Flatulent distension of intestines, 152.
* Contraction of abdominal muscles, 36.
* Intestinal obstruction, 156, 177, 178.

c. Resembling that of a living body in the abdomen.

* Contraction of abdominal muscles, 36, 247.
* Intestinal flatulence, 36.
* Pregnancy, 199, 225.
* Extra-uterine pregnancy, 209.

303. *Gaseous vibration*, 37.

Passage of gas in intestinal flatulence, 37.

304. *Gurgling under hand on pressure*, 37.

* Dilatation of stomach, 142.
* Spasmodic closure of pylorus, 150.
* Dyspepsia of liquids, 150.
* Intestinal obstruction, 156.
* Typhoid fever, 157.
* Peritoneal abscess, with intestinal perforation, 176, 183.

305. *Friction sensation*, 38.

* Acute peritonitis, 172, 173, 187.
* Peritoneal adhesion, 174, 243.

306. *Crepitation or grating*, 39.

Calculi in gall-bladder, 110.
Calculi in kidney? 136.
Accumulation of hard bodies in intestine, 155.
* Emphysematous tumour, 159, 160.
Intestinal perforation, with peritoneal abscess, 176, 183.

307. *Fluctuation*, 40.

* Abscess of liver, 94.
Cancer of liver, (obscure and doubtful), 98.
Hydatid disease of liver, (obscure), 101.
* Serous cysts of liver, 103.
* Dilatation of gall-bladder, 105.
* Dilatation of bile ducts, 107.
Distension of liver with bile, 108.
Enlargement of spleen (false), 117.
* Abscess of spleen, 122.
* Pyelitis, with much purulent distension of kidney, 130.
* Perinephritis, 131.
* Hydronephrosis, 132.
* Cysts of kidney, 133.
Cancer of kidney, (obscure), 134.
* Dilatation of stomach, (at depending part), 142.
* Ascites, 166, 167, 170, 204.
* Cysts ruptured into peritoneum, 169, 241.
* Hæmorrhage into peritoneum, 171.
* Acute peritonitis, with liquid effusion, 172.
* Circumscribed peritoneal abscess, 175.
* Chronic peritonitis, with liquid effusion, 177, 178.
Cancer of peritoneum, containing blood; colloid, 180.
* Hydatid disease of peritoneum, (obscure), 181, 186.
* Distension of bladder, 184, 185, 206.
* Pelvic abscess, 187, 230.
* Dropsy of amnion, 205.
* Retention of menses, 214.
* Hydatids of uterus, 215.
* Hydrometra, 216.
Fibrous tumour of uterus, softened, (obscure), 223.
* Encysted disease of ovary, 235, 241, 244, 246.
Encephaloid cancer of ovary, (obscure), 247.
* Abscess in wall, 260.
* Encysted disease in wall, 261.
Cancerous tumour in wall, (obscure), 262.
* Lumbar abscess, 263.

308. *Fluctuation varying in seat, or readiness of perception, by change of posture*, 40.

Serous cyst of liver, between its convexity and diaphragm, 103.
* Dilatation of stomach, 142.
* Ascites, 166, 167, 169.
Hæmorrhage into peritoneum, 171.
* Acute peritonitis, 169, 172.
* Chronic peritonitis, 177.
* Cysts ruptured into peritoneum, 169, 241.

309. *Repercussion, (abdominal)*, 41.

Ascites, with moveable tumour, 167, 247.
* Pregnancy, 199.

310. *Pulsation*, 42.

a. Extensive in course of large arteries.

Diseases producing general abdominal retraction, 269.
Enteritis, 157.
* Nervous abdominal pulsation, 248.

b. In a tumour; forcible and expansile in all directions.

* Aneurism of aorta, 250, 252.
* Aneurism of cœliac artery, 253.
* Aneurism of superior mesenteric artery, 254.
* Aneurism of external iliac artery, 256.
Varicose aneurism, 257.

c. In a tumour; solely or almost solely in vertical direction, not forcibly expansile.

* Tumour overlying aorta or large vessels—*e.g.*, 88, 98, 101, 113, 114, 117, 127, 138, 149, 154, 155, 163, 178, 180, 184, 235, 260, 263, 265.

d. In a line along surface of tumour.

* Artery crossing a tumour, 238, 248, 264, 265.

311. *Thrill*, 43.

Enlargement of spleen, 119.
* Aneurism of aorta, 251.
* Aneurism of cœliac artery, 253.
* Aneurism of superior mesenteric artery, 254.
* Aneurism of external iliac artery, 256.
* Varicose aneurism, 257.

Examination by the Vagina.

312. *Os and cervix uteri depressed*, 46.

* Displacement of uterus downwards, 166, 189, 211, 214, 216, 218, 219, 221, 224, 226, 228, 236.
* Pregnancy, early, 200.

313. *Os and cervix uteri elevated*, 46.

- * Displacement of uterus upwards, 154, 171, 186, 187, 190, 194, 197, 211, 213, 221, 226, 227, 228, 230, 236, 243, 247.
- * Retroversion of uterus, 192.
- * Anteversion of uterus, 193.
- * Pregnancy, 200, 207, 225.

314. *Os and cervix uteri lying to one side of pelvis*, 46.

- * Displacement of uterus to one side, 187, 191, 211, 230.
- Fibrous tumour of uterus, 221.

315. *Os and cervix uteri lying too anteriorly*, 46.

- * Fæcal accumulation in rectum, 154.
- * Clot of blood in pelvis, 171.
- * Hydatid cyst in pelvis, 186.
- * Retroversion of uterus, 192.
- Retroflexion of uterus, 195.
- Extra-uterine pregnancy, 211.
- Fibrous tumour of uterus, 221.
- Inflammation and abscess of ovary, 230.
- * Encysted disease of ovary, 236.

316. *Os and cervix uteri lying too posteriorly*, 46.

- Distension of bladder, 184.
- * Anteversion of uterus, 193.

317. *Direction of os and cervix uteri altered*, 46.

a. Os uteri looking forwards, or forwards and upwards.

- * Retroversion of uterus, 175, 192, 195, 203, 211, 218, 224, 236.
- Anteflexion of uterus, with prolapsus, 196.
- * Pregnancy, (slightly), 200.
- * Prolapsus uteri, (slightly), 189.
- Fibrous tumour of uterus, 221.

b. Os uteri looking backwards, or backwards and upwards.

- * Anteversion of uterus, 193, 203, 211, 214, 218.
- * Pregnancy, 200.

c. Os uteri looking towards one side of uterus.

- * Lateral inclination of uterus, 194, 218, 221.

318. *Cervix uteri shortened or lost*, 46.

- * Pregnancy, 200, 205, 207.
- Retention of menses, 214.
- * Hydatids of uterus, 215.
- * Fibrous tumour of uterus, 221, 226.
- Cancer of body of uterus, 227.
- * Soft polypus of uterus, 228.

319. *Cervix uteri swollen and softened*, 46.

- * Pregnancy, 200.
- * Extra-uterine pregnancy, early, 211.

320. *Os uteri closed*, 46.

* Pregnancy, 200, 205.
* Extra-uterine pregnancy, early, 211.
* Retention of menses, 214.
Hydatids of uterus, 215.
* Physometra, 217.

321. *Lower segment of body of uterus enlarged*, 46.

* Pregnancy, 200, 205, 207.
* Retention of menses, 214.
* Hydatids of uterus, 215.
* Hydrometra, 216.
* Physometra, 217.
* Congestion and hypertrophy of uterus, 218.
* Fibrous tumour of uterus, 219, 226.
Cancer of body of uterus, 227.
* Soft polypus of uterus, 228.

322. *Uterus increased in weight*, 46.

* Pregnancy, 200, 207.
* Retention of menses, 214.
* Hydatids of uterus, 215.
* Hydrometra, 216.
* Congestion and hypertrophy of uterus, 218.
* Fibrous tumour of uterus, 219, 221, 226.
* Cancer of body of uterus, 227.
* Soft polypus of uterus, 228.

323. *Enlarged uterus*, (*light*), 46.

* Physometra, 217.

324. *Uterus immoveable*, 46.

* Cancer of pelvic peritoneum, 180.
* Pelvic abscess, 187, 230.
* Adhesion, 192, 193, 227.
* Fæcal accumulation above uterus, 192.
Retention of menses, 214.
Fibrous tumour of uterus, 221.

325. *Repercussion* (*vaginal*), "*Ballottement*," 46.

* Pregnancy, 200, 205.

326. *Uterus and uterine tumour felt continuous with abdominal tumour*, 46.

* Pregnancy, 200, 207.
Extra-uterine pregnancy, 211.
* Retention of menses, 214.
* Hydatids of uterus, 215.
* Hydrometra, 216.
* Physometra, 217.
* Congestion and hypertrophy of uterus, 218.
* Fibrous tumour of uterus, 219, 221, 224, 226.
* Polypus of uterus, 228.
Encysted disease of ovary, 236, 243.

327. *Fluctuation felt in uterus*, 46.

* Dropsy of amnion, 205.
* Retention of menses, 214.
* Hydrometra, 216.

328. *Substance perceived within cavity of uterus*, 46.

* Pregnancy, 200, 207.
* Hydatids of uterus, 215.
* Fibrous tumour of uterus, 226.
* Cancer of body of uterus, 227.
* Soft polypus of uterus, 228.

329. *Vagina elongated*, 46.

* Diseases elevating os and cervix uteri, 313.

330. *Vagina shortened*, 46.

* Diseases depressing os and cervix uteri, 312.

331. *Vagina inverted*, 46.

* Displacement downwards of uterus, 189.

332. *Vagina directed unusually forwards*, 46.

* Diseases pressing os and cervix uteri forwards, 315.

333. *Vagina directed unusually backwards*, 46.

* Diseases pressing os and cervix uteri backwards, 316.

334. *Vagina directed towards one side*, 46.

* Diseases pressing os and cervix uteri to one side, 314.

335. *Canal of vagina obstructed*, 46.

* Occlusion of vagina, 214.
* Polypus of uterus, 226, 228.

336. *Resistance to pressure on vaginal wall*, 46.

* Pelvic inflammation and abscess, 187.
* Tumours, etc., behind vagina, 337.

337. *Tumours felt through vaginal wall*, 46.

a. Anteriorly.

* Distended bladder, 184, 206.
* Anteflexion of uterus, 196, 214.
* Pregnancy, 200, 207.

- * Diseases expanding lower segment of uterus, 321.
- * Anteversion of uterus, 193, 214, 218.

b. Posteriorly.

- * Fæcal accumulation in rectum, 154.
- * Cancer of rectum, 163.
- * Clot of blood in pelvis, 171.
- * Peritoneal abscess in pelvis, 175.
- * Cancer of pelvic peritoneum, 180.
- * Hydatid cyst in pelvis, 186.
- * Pelvic abscess, 187.
- * Retroversion of uterus, 192, 203, 218, 224, 236.
- * Retroflexion of uterus, 195.
- * Extra-uterine pregnancy, 211, 213.
- Retention of menses, 214.
- * Fibrous tumour of uterus, 221, 225.
- Cancer of body of uterus, 227.
- * Downward displacement of ovary, 229.
- * Inflammation and abscess of ovary, 230.
- * Encysted disease of ovary, 236, 240, 241, 242, 244, 246.

c. Laterally.

- * Pelvic abscess, 187, 230.
- * Fibrous tumour of uterus, 221.

338. *Pelvic tumour felt continuous with abdominal tumour*, 46.

- * Pelvic abscess, 187, 230.
- * Extra-uterine pregnancy, 211, 213.
- * Fibrous tumour of uterus, 221.
- * Encysted disease of ovary, 236, 246.
- * Tumour of uterus continuous with abdominal tumour, 326.

339. *Fluctuation felt in pelvic tumour*, 46.

- * Peritoneal abscess in pelvis, 175.
- * Distension of bladder, 184, 206.
- * Pelvic abscess, 187.
- * Hydatid cyst in pelvis, 186.
- Extra-uterine pregnancy, 213.
- * Retention of menses, 214.
- * Abscess of ovary, 230.
- * Encysted disease of ovary, 236.
- * Fluctuating tumour of uterus, 327.

340. *Pelvic tumour immoveable*, 46.

- * Cancer of pelvic peritoneum, 180.
- * Hydatid cyst in pelvis, 186.
- * Pelvic abscess, 187.
- * Flexions or versions of uterus, with adhesion or fæcal accumulation above fundus, 192, 193, 195, 196.
- Fibrous tumour of uterus, 221.
- * Displacement of ovary, with adhesion, 229.
- * Inflammation and abscess of ovary, 230.
- * Encysted disease of ovary, adherent or impacted, 243.

Examination by the Rectum.

341. *Obstruction in canal*, 47.

* Fæcal accumulation, 154.
* Obstruction in rectum, 156.
* Cancer of rectum, 163.

342. *Tumour felt through rectum*, 47.

a. Anteriorly.

* Clot of blood in pelvis, 171.
* Peritoneal abscess in pelvis, 175.
* Cancer in pelvic peritoneum, 180.
* Distension of bladder, 184.
* Hydatid cyst in pelvis, 186.
* Pelvic abscess, 187.
* Prolapsus uteri, 189.
* Retroversion of uterus, 192, 203, 221, 224, 236.
* Retroflexion of uterus, 195.
* Pregnancy, 198, 207.
* Extra-uterine pregnancy, 211, 213.
* Retention of menses, 214.
* Hydatids of uterus, 215.
* Hydrometra, 216.
* Physometra, 217.
* Congestion and hypertrophy of uterus, 218.
* Fibrous tumour of uterus, 219, 221, 224, 226.
* Cancer of body of uterus, 227.
* Soft polypus of uterus, 228.
* Displacement of ovary downwards, 229.
* Inflammation and abscess of ovary, 230.
* Encysted disease of ovary, 236.

b. Posteriorly.

* Cancer of sacral glands, 264.

c. Laterally.

* Cancer of sacral glands, 264.

343. *Fluctuation felt in pelvic tumour*, 47.

* Peritoneal abscess in pelvis, 175.
* Distension of bladder, 184.
* Hydatid cyst in pelvis, (indistinct), 186.
* Pelvic abscess, 187.
* Abscess of ovary, 230.
* Encysted disease of ovary, 236.

Examination by the vagina and rectum conjoined.

344. *Tumour palpable*, 47.

* Clot of blood in pelvis, 171.
* Peritoneal abscess in pelvis, 175.
* Cancer in pelvic peritoneum, 180.
* Hydatid cyst in pelvis, 186.
* Retroversion of uterus, 192, 203, 218, 221.
* Retroflexion of uterus, 195.
* Extra-uterine pregnancy, 211, 213.

Fibrous tumour of uterus, 221.
* Displacement of ovary downwards, 229.
* Inflammation and abscess of ovary, 230.
* Encysted disease of ovary, 236.

PERCUSSION.

345. *Liver dulness and resistance elevated*, 57, *a*.

- * Enlargement of right kidney, great, 126.
- * Flatulent distension of intestines, great, 152, 157.
- * Intestinal obstruction, with much enlargement of abdomen, 156.
- * Ascites, considerable, 166, 167, 170, 204.
- * Acute peritonitis, 172.
- * Chronic peritonitis, with much enlargement of abdomen, 177, 178.
- Cancer of peritoneum, extensive, 180.
- * Hydatid disease of peritoneum, extensive, 181.

346. *Liver dulness and resistance depressed*, 57, *a*.

- * Displacement of liver downwards, 91.
- * Diseases producing considerable abdominal retraction, 269.

347. *Liver dulness continuous over an extended space*, 57, *b*.

- * Enlargement of liver, 89, 96, 120.
- * Congestion of liver, 92.
- * Hepatitis, 93.
- * Abscess of liver, 94.
- * Cancer of liver, 99.
- * Fatty liver, 97.
- * Hydatid disease of liver, 101.
- * Serous cyst of liver, 103.
- * Dilatation of gall-bladder, 105.
- * Dilatation of bile ducts, 107.
- * Distension of liver with bile, 108.
- * Abscess of gall-bladder, 109.
- Enlargement of spleen, 120.
- Enlargement of right kidney, great, 128.
- Concretion in stomach, 151.
- Fæcal accumulation, in contact with margin of liver, 154.
- Intestinal concretion, in contact with margin of liver, 155.
- * Intestinal obstruction, with accumulation in transverse and ascending colon, 156.
- * Ascites, (when lying on right side), abundant, 166, 170.
- * Circumscribed peritoneal abscess, 175.
- * Cancer of peritoneum, small omentum, etc., 180.
- * Hydatid disease of peritoneum, 181.
- Extra-uterine pregnancy, high up, 212.
- Encysted disease of ovary, 237.
- Aneurism of aorta, 251.
- Phlegmon and abscess in wall, 260.
- Tumour in wall, 261, 262.

348. *Liver dulness and resistance diminished in extent*, 57, *c*.

- Cirrhosis of liver, 104.
- * Flatulent distension of stomach, 144.
- * Flatulent distension of intestines, 152.

349. *Limits of liver dulness unaltered, or imperfectly altered, by respiration*, 57, *d*.

- * Enlargement of liver, great, 89, 96.
- * Adhesion of liver, 94.
- * Diseases obstructing the descent of diaphragm generally, or on right side only, 281.

350. *Deep dulness too great near margin of liver*, 57, *e*.

- * Enlargement of liver, with thickening of edge, 89, 96.
- * Congestion of liver, 92.
- * Hepatitis, 93.
- * Abscess of liver, thickening edge, or with general enlargement of liver, 94.
- * Cancer of liver, thickening edge, 99.
- * Distension of liver with bile, 108.
- * Fæcal accumulation, or other tumour behind margin of liver, 154.

351. *Resonance over seat of natural dulness of liver*, 57, *f*.

- * Abscess of liver burst into lungs or digestive canal, (partial), 95.
- * Gas in peritoneum, 182, 183.
- Air in liver ?, 57.

352. *Dulness of spleen displaced*, 58, *a*.

a. Upwards.

- * Displacement of spleen upwards, 115.

b. Downwards.

- * Displacement of spleen downwards, 115.

353. *Dulness of spleen increased in extent*, 58, *b*.

- * Enlargement of spleen, 118.
- * Congestion of spleen, 121.
- * Inflammation and abscess of spleen, 122.
- * Cancer of spleen, 123.
- * Hydatid disease of spleen, 124.
- * Hydatid disease of peritoneum, 124, 181.

354. *Dulness of spleen diminished in extent*, 58, *c*.

- * Diminution of spleen in size, 58, *c*.
- * Flatulent distension of stomach, 144.
- * Flatulent distension of intestines, 152.

355. *Dulness of kidney altered in position*, 59, *a*.

- * Displacement of kidney, 125.

356. *Dulness of kidney increased in extent*, 59, *b*.

* Enlargement of kidney, 128.
* Pyelitis, 130.
* Perinephritis, 131.
* Hydronephrosis, 132.
* Cysts of kidney, 133.
* Cancer of kidney, 134.
* Enlargement of supra-renal capsule, 139.

357. *Dulness of kidney diminished in extent*, 59, *c*.

Atrophy of kidney, 137.

358. *Resonance of stomach displaced*, 60, *a*.

a. Upwards.

* Diaphragmatic hernia, 140.
* Displacement of stomach upwards, 141.

b. Downwards.

* Displacement of stomach downwards, by pressure or traction, 60 *a*, 141.

c. To right.

* Displacement of stomach to right, 141.

d. To left.

* Displacement of stomach to left, 141.

359. *Resonance of stomach increased in extent*, 60, *b*.

* Dilatation of stomach, 143.
* Flatulent distension of stomach, 144.

360. *Resonance of stomach diminished in extent*, 60, *c*.

Diaphragmatic hernia, 140.
* Contraction of stomach, 145.
* Cancer of cardia, 147.
* Cancer of parietes encroaching on cavity, 148.
* Protracted vomiting, 150.

361. *Resonance of stomach unusually tympanitic, or amphoric*, 60, *d*.

* Dilatation of stomach, with flatulent distension, 143.
* Flatulent distension of stomach, 144.

362. *Resonance of stomach defective*, 60, *e*.

Enlargement of liver, left lobe, 60 *e*.
Contraction of stomach, 145.
Hypertrophy of stomach, 146.
* Cancer of cardia, 147.
* Cancer of parietes, (replaced by dulness, if encroaching much on cavity), 148.

Protracted vomiting, 150.
* Hæmorrhage into stomach, (replaced by dulness), 150.
* Concretion in stomach, (replaced by dulness), 151.

363. *Gravitation dulness of stomach unnaturally persistent*, 60, *d*.

* Prolonged retention of alimentary matters, 142, 146, 149, 150.

364. *Humoric sound in stomach unnaturally persistent*, 60, *d*.

* Prolonged retention of liquid alimentary matters, 142, 146, 149, 150.

365. *Dulness of colon on administering a large enema, limited in extent*, 61.

* Intestinal obstruction in colon, 156.

(*After separating liver, spleen, and stomach.*)

366. *Abdominal resonance unnaturally extended*, 62.

* Flatulent distension of intestines, 152, 157.
* Acute peritonitis, 172.
* Gas in peritoneum, 182, 183.

367. *Abdominal resonance considerably contracted in extent*, 63.

* Diseases producing extended dulness over abdomen, 371, *n*.
* Diseases producing general abdominal retraction, 63, 269.

368. *Abdominal resonance unusually tympanitic*, 64.

* Flatulent distension of intestines, 152, 157.
* Colic, (over local fulness), 153.
* Acute peritonitis, 172.
* Gas in peritoneum, 182, 183.

369. *Abdominal resonance unusually uniform in pitch*, 64.

Flatulent distension of intestines, 152.
Acute peritonitis, 172.
* Gas in peritoneum, 182, 183.

370. *Humoric sound*, 64.

Intestinal obstruction, where gas and liquid matter are in contact, 156.
Typhoid fever, or diarrhœa, 157.
Intestinal perforation, with peritoneal abscess, 176, 183.

371. *Dulness or diminished resonance with increased resistance over abdomen*, 65.

a. Left hypochondrium.

* Abscess of liver, left lobe, tumour, 94.
* Cancer of liver, left lobe, tumour, 99.
* Fatty liver, 97.

- * Displacement of spleen, tumour, 115.
- * Enlargement of spleen, 118.
- * Congestion of spleen, 121.
- * Inflammation of spleen, 122.
- * Cancer of spleen, 123.
- * Hydatid disease of spleen, 124.
- * Displacement of left kidney, tumour, 125.
- * Cancer of left kidney, tumour, 134.
- * Diseases of stomach diminishing its resonance, 360.
- * Cancer of pylorus, tumour, 149.
- * Fæcal accumulation, 154.
- * Intestinal concretion, tumour, 155.
- * Circumscribed peritoneal abscess, 175.
- * Tuberculous disease of omentum, tumour, 178.
- * Cancer of peritoneum, tumour, 180.
- * Hydatid disease of peritoneum, tumour, 181, 124.
- * Aneurism of aorta, tumour, 251, 252.
- Phlegmon and abscess in wall, 260.

b. Epigastrium.

- * Enlargement of liver, especially of left lobe, 89, 96.
- * Displacement of liver, 91.
- * Congestion of liver, 92.
- * Hepatitis, 93.
- * Abscess of liver, especially of left lobe, 94.
- * Fatty liver, 97.
- * Cancer of liver, 99.
- * Hydatid disease of liver, 101.
- * Serous cyst of liver, 103.
- * Dilatation of bile ducts, 107.
- * Distension of liver with bile, 108.
- Enlargement of spleen, 118.
- * Diseases of stomach diminishing its resonance, 362.
- * Cancer of pylorus, tumour, 149.
- * Circumscribed peritoneal abscess, 175.
- * Cancer of peritoneum, omentum, tumour, 180.
- * Aneurism of aorta, tumour, 251.
- Aneurism of cœliac artery, tumour, 253.
- Aneurism of superior mesenteric artery, tumour, 254.
- * Phlegmon and abscess in wall, 260.

c. Upper part of abdomen, extensively.

- * Enlargement of liver, great and extended laterally, 89, 96.
- * Abscess of liver, large, numerous, or with much general enlargement, 94.
- * Fatty liver, 97.
- * Cancer of liver, tumour, 99.
- * Hydatid disease of liver, tumour, 101.
- * Dilatation of bile ducts, extensive, 107.
- * Distension of liver with bile, 108.
- * Fæcal accumulation in transverse colon, tumour, 154.
- * Intestinal obstruction, at or below gastro-splenic curve of colon, 156.
- * Circumscribed peritoneal abscess, 175.

- * Tuberculous disease of omentum, tumour, 178.
- * Cancer of peritoneum, omentum, tumour, 180.
- * Extra-uterine pregnancy, tumour, 212.
- Phlegmon and abscess in wall, 260.

d. Right flank and side of abdomen.

- * Enlargement of liver, considerable, 89, 96.
- * Abscess of liver, large, right lobe, 94.
- Fatty liver, 97.
- * Cancer of liver, right lobe, extensive, 99.
- * Hydatid disease of liver, tumour, 101.
- * Serous cyst of liver, tumour, 103.
- * Dilatation of gall-bladder, great, 105.
- * Dilatation of bile ducts, tumour, 107.
- * Distension of liver with bile, 108.
- * Enlargement of right kidney, great, tumour, 128.
- * Pyelitis, with purulent distension of kidney, tumour, 130.
- * Perinephritis, tumour, 131.
- * Hydronephrosis, considerable, tumour, 132.
- * Cysts of kidney, tumour, 133.
- * Cancer of kidney, tumour, 134.
- * Enlargement of supra-renal capsule, tumour, 139.
- * Cancer of pylorus, tumour, 149.
- * Fæcal accumulation, 154.
- * Intestinal obstruction, near or beyond hepatic curve of colon, 156.
- * Intestinal concretion, tumour, 155.
- * Ascites, and other fluid accumulations in peritoneum, (when lying on right side), 166, 169, 241.
- * Circumscribed peritoneal abscess, 175.
- * Tuberculous disease of peritoneum, tumour, 178.
- * Chronic peritonitis, over effusion on this side, 177.
- * Cancer of peritoneum, omentum, tumour, 180.
- * Hydatid disease of peritoneum, tumour, 181.
- * Extra-uterine pregnancy, tumour, 212.
- * Encysted disease of ovary, 237, 243.
- * Aneurism of aorta, tumour, 251, 252.
- Phlegmon and abscess in wall, 260.
- Tumour in wall, 261, 262.
- * Psoas abscess, tumour, 263.
- * Cancer of deep lymphatic glands, tumour, 264.

e. Left flank and side of abdomen.

- * Enlargement of spleen, considerable, or with displacement, tumour, 118.
- * Congestion of spleen, great, tumour, 121.
- * Enlargement of left kidney, great, tumour, 128.
- * Pyelitis, with purulent distension of kidney, tumour, 130.
- * Perinephritis, tumour, 131.
- * Hydronephrosis, considerable, tumour, 132.

* Cysts of kidney, tumour, 133.
* Cancer of kidney, tumour, 134.
* Enlargement of supra-renal capsule, tumour, 139.
* Cancer of pylorus, tumour, 149.
* Fæcal accumulation, 154.
* Intestinal concretion, tumour, 155.
* Intestinal obstruction, in sigmoid flexure or rectum, 156.
* Inflammatory thickening of descending colon, if containing solid or liquid matter, tumour, 160.
* Ascites, and other fluid accumulations in peritoneum, (when lying on left side), 166, 169, 241.
* Circumscribed peritoneal abscess, 175.
* Tuberculous disease of peritoneum, tumour, 178.
* Chronic peritonitis, over effusion on this side, 177.
* Cancer of peritoneum, mesentery, tumour, 180.
* Hydatid disease in peritoneum, tumour, 181.
* Extra-uterine pregnancy, tumour, 212.
* Encysted disease of ovary, 237, 243.
* Aneurism of aorta, 251, 252.
Aneurism of renal artery, 255.
Phlegmon and abscess in wall, 260.
Tumour in wall, 261, 262.
* Psoas abscess, tumour, 263.
* Cancer of deep lymphatic glands, tumour, 264.

f. Umbilical region.

* Abscess of liver, situated low, or with general enlargement of liver, 94.
* Cancer of liver, 99.
* Hydatid disease of liver, situated low, or with general enlargement of liver, 101.
* Dilatation of gall-bladder, tumour, 105.
* Abscess of gall-bladder, tumour, 109.
* Enlargement of spleen, with displacement, tumour, 118.
* Cancer of pylorus, tumour, 149.
* Dilated stomach, containing alimentary matters, 142.
* Concretion in stomach, tumour, 151.
* Fæcal accumulation, 154.
* Intestinal concretion, tumour, 155.
* Intestinal obstruction, at or near gastro-splenic curve of colon, 156.
Cancer of duodenum, tumour, (not absolutely dull), 162.
* Cancer of transverse colon, extensive and encroaching much on cavity, tumour, (rarely absolutely dull), 163.
Ascites, 170, 244, 204.
* Circumscribed peritoneal abscess, 175.
* Tuberculous disease of omentum, tumour, 178.
* Cancer of peritoneum, tumour, 180.
* Hydatid disease of peritoneum, tumour, 181.
* Extra-uterine pregnancy, tumour, 212.
* Encysted disease of ovary, 237, 244.
* Pregnancy, 204, 246.
* Aneurism of aorta, tumour, 251.

- * Aneurism of superior mesenteric artery, tumour, 254.
- Fat in wall, 259.
- Phlegmon and abscess in wall, 260.
- Tumour in wall, 261, 262.
- * Cancer of deep lymphatic glands, tumour, 264.

g. Right postero-lumbar region, (extended dulness).

- * Enlargement of liver, 89, 96.
- * Enlargement of right kidney, 128.
- * Pyelitis, 130.
- * Perinephritis, 131.
- * Hydronephrosis, 132.
- * Cysts of kidney, 133.
- * Cancer of kidney, 134.
- Enlargement of supra-renal capsule, 139.
- Congestion of kidney, (moderate), 126.
- Nephritis, with enlargement, (moderate), 126.
- Tuberculous disease of kidney, (moderate), 135.
- * Intestinal obstruction, in ascending colon, or, at or near hepatic curve of colon, 156.
- * Abscess in wall, 159.
- * Lumbar abscess, 263.

h. Left postero-lumbar region, (extended dulness).

- * Enlargement of spleen, 118.
- * Enlargement of left kidney, 128.
- Congestion of kidney, (moderate), 116.
- Nephritis, (moderate), 126.
- Pyelitis, 130.
- * Perinephritis, 131.
- * Hydronephrosis, 132.
- * Cysts of kidney, 133.
- * Cancer of kidney, 134.
- Tuberculous disease of kidney, (moderate), 135.
- Enlargement of supra-renal capsule, 139.
- * Intestinal obstruction, in rectum or sigmoid flexure, 156.
- * Aneurism of aorta, 251.
- * Lumbar abscess, 263.

i. Right iliac region.

- * Displacement of right kidney, tumour, 125.
- * Cancer of pylorus, tumour, 149.
- * Fæcal accumulation, 154.
- * Intestinal concretion, 155.
- * Intestinal obstruction, 156.
- * Typhlitis, (deficient resonance), 159.
- * Cancer of cæcum, (dulness or deficient resonance), 163.
- * Ascites, (if dependent), 166, 169.
- * Acute peritonitis, with effusion, (if dependent), 172, 169.
- * Circumscribed peritoneal abscess, 175.
- * Chronic peritonitis, with effusion, (if dependent), 177.
- * Tuberculous disease of peritoneum, tumour, 178.
- * Cancer of peritoneum, tumour, 180.
- * Displacement of bladder, 185.
- * Pelvic abscess, tumour, 187.
- * Pregnancy, with lateral obliquity, tumour, 203.
- * Extra-uterine pregnancy, tumour, 212, 213.

* Retention of menses, tumour, 214.
* Fibrous tumour of uterus, 222, 224.
* Inflammation and abscess of ovary, tumour, 230.
* Encysted disease of ovary, tumour, 237.
* Solid ovarian tumour, 247.
* Aneurism of aorta, tumour, 251.
* Aneurism of external iliac artery, tumour, 256.
Phlegmon and abscess in wall, 260.
Tumour in wall, 261, 262.
* Psoas abscess, tumour, 263.
* Cancer or other enlargement of deep lymphatic glands, tumour, 264.

k. Left iliac region.

* Displacement of spleen, with or without enlargement, tumour, 115.
* Displacement of left kidney, tumour, 125.
* Concretion in stomach, tumour, 151.
* Fæcal accumulation, 154.
* Intestinal concretion, tumour, 155.
* Intestinal obstruction, 156.
* Inflammatory thickening of sigmoid flexure, tumour, (deficient resonance), 160.
* Cancer of sigmoid flexure, tumour, (deficient resonance or dulness), 163.
* Ascites, (if dependent), 166, 169.
* Acute peritonitis, with effusion, (if dependent), 169, 172.
* Circumscribed peritoneal abscess, 175.
* Chronic peritonitis, with effusion, (if dependent), 177.
* Tuberculous disease of peritoneum, tumour, 178.
* Cancer of peritoneum, tumour, 180.
* Displacement of bladder, 185.
* Pelvic abscess, tumour, 187.
* Pregnancy, with lateral obliquity, tumour, 203.
* Extra-uterine pregnancy, tumour, 212, 213.
* Retention of menses, tumour, 214.
* Fibrous tumour of uterus, 222.
* Inflammation and abscess of ovary, tumour, 230.
* Encysted disease of ovary, 237.
* Solid ovarian tumour, 249.
* Aneurism of aorta, tumour, 251.
* Aneurism of external iliac artery, tumour, 256.
Phlegmon and abscess in wall, 260.
Tumour in wall, 261, 262.
* Psoas abscess, tumour, 263.
* Cancer or other enlargement of deep lymphatic glands, tumour, 264.

l. Hypogastrium.

* Cancer of pylorus, tumour, 149.
Dilated stomach, containing alimentary matter, 142.
* Fæcal accumulation, tumour, 154.
* Cancer of sigmoid flexure, tumour, 163.
* Ascites, 166, 241, 244.
* Cysts, etc., ruptured into peritoneum, 169, 241.
* Hæmorrhage into peritoneum, 171.
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